

**APPENDIX E**

**ENVIRONMENTAL ASSESSMENT**



**PROPOSED NEW WORK DREDGING  
BALTIMORE HARBOR AND CHANNELS MARYLAND  
42-FOOT PROJECT-BREWERTON CHANNEL EASTERN EXTENSION  
DRAFT ENVIRONMENTAL ASSESSMENT**

**Prepared By:  
Baltimore District  
U.S. Army Corps of Engineers  
Baltimore, Maryland**

**April 1997**



## DRAFT FINDING OF NO SIGNIFICANT IMPACT

(FONSI)

### PROPOSED NEW WORK DREDGING

#### BALTIMORE HARBOR AND CHANNELS MARYLAND

##### 42-FOOT PROJECT-BREWERTON CHANNEL EASTERN EXTENSION

The Baltimore District, U.S. Army Corps of Engineers, in cooperation with the State of Maryland Department of Transportation, is conducting a Limited Reevaluation Study to evaluate proposed new work dredging for Brewerton Channel Eastern Extension. The purpose of the proposed project is to increase the efficiency and safety of the Port of Baltimore by widening the Brewerton Channel Eastern Extension.

The Baltimore District, U.S. Army Corps of Engineers, currently maintains the Brewerton Channel Eastern Extension Federal navigation channel. The River and Harbor Act of 3 July 1958 authorized the deepening of the main approach channels to Baltimore Harbor from 39 feet to 42 feet and the deepening and widening of the connecting channels to the Chesapeake and Delaware Canal (C&D) from 27 feet to 35 feet deep and from 400 feet to 600 feet wide. The connecting channels are comprised of the Brewerton Channel Eastern Extension, and the Tolchester and Swan Point Channels. In addition, the project authorized maintenance of a 39-foot depth in the Northwest Branch, provided that local interests first deepen the channels to that depth. All of the improvements authorized by the 1958 Act have been constructed with the exception of the Brewerton Channel Eastern Extension. Brewerton Channel Eastern Extension, which has an authorized depths of 35 feet and widths of 600 feet, was constructed to depths of 35 feet and widths of 450 feet in 1986. The eastern end of the channel was widened from 450 feet to 600 feet in 1991-1992 to improve safety.

The proposed action in this environmental assessment (EA) is to widen the remaining western 5 miles of the channel from 450 feet to its authorized width of 600 feet. The dredging requires the removal of approximately 2,500,000 cubic yards of material and includes 2 feet of advanced maintenance dredging and 2 feet of allowable overdepth dredging. The State of Maryland has designated the Hart-Miller Island (HMI) containment facility for the deposition of the dredged material. In order to maximize drying and consolidation of the material at Hart-Miller Island, dredging will be scheduled to take place between October and March.

An EA has been prepared that evaluates the placement of dredged material from the Brewerton Channel Eastern Extension and the placement of dredged material at the HMI placement site. Potential impacts were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem, endangered and threatened species, hazardous and toxic materials, aesthetics and recreation, cultural

resources, and the general needs and welfare of the public. In accordance with Section 404 of the Clean Water Act, a Section 404(b)(1) analysis was conducted for the proposed actions. The analyses determined that the proposed project would have no significant adverse impacts to the aquatic ecosystem.

For the purposes of this EA HMI is the selected placement site. Also evaluated was the potential of using other dredged material placement sites. None of the existing sites except for HMI are presently administratively feasible for this project. The proposed Poplar Island Restoration Project, and the Pooles Island site are covered by approved NEPA documentation and are considered to be environmentally acceptable. The Kent Island Deep Site 104 may become available in the near future after environmental studies have been completed and NEPA documentation has been prepared. Upon completion of these documents, and prior to use, the Baltimore District will determine whether this site is an environmentally acceptable and cost-effective location for placement of material from Brewerton Channel Eastern Extension.

This EA was prepared in accordance with the provisions of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) Regulations 40 CFR 1500-1508, U.S. Army Corps of Engineers Regulations 200-2-2 "Procedures for Implementing NEPA", and 33 CFR 230.

Upon reviewing the EA, I find that the potential negative impacts to benthic and open water habitat associated with the implementation of the project will occur over a relatively small area and will be primarily short-term in nature. Based upon this finding, preparation of an Environmental Impact Statement is not required.

Randall R. Inouye P.E.  
Colonel, Corps of Engineers  
District Engineer

**PROPOSED NEW WORK DREDGING**

**BALTIMORE HARBOR AND CHANNELS MARYLAND**

**42-FOOT PROJECT-BREWERTON CHANNEL EASTERN EXTENSION**

**ENVIRONMENTAL ASSESSMENT**

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PROPOSED NEW WORK DREDGING  
BALTIMORE HARBOR AND CHANNELS MARYLAND  
BREWERTON CHANNEL EASTERN EXTENSION  
ENVIRONMENTAL ASSESSMENT

The Baltimore District, U.S. Army Corps of Engineers (USACE), currently maintains the Brewerton Channel Eastern Extension Federal navigation channel. The River and Harbor Act of 3 July 1958 authorized the deepening of the main approach channels to Baltimore Harbor from 30 feet to 42 feet and, the deepening and widening of the connecting channels to the Chesapeake and Delaware (C&D) Canal from 27 feet to 35 feet deep and from 400 feet to 600 feet wide. The connecting channels are comprised of the Brewerton Channel Eastern Extension, and the Tolchester and Swan Point Channels. In addition, the project authorized maintenance of a 39-foot depth in the Northwest Branch, provided that local interests first deepen the channels to that depth. All of the improvements authorized by the 1958 Act have been constructed with the exception of the Brewerton Channel Eastern Extension. The Brewerton Channel Eastern Extension has an authorized depth of 35 feet and width of 600 feet and was constructed to a depth of 35 feet and width of 450 feet in 1986. The eastern end of the channel was widened from 450 feet to 600 feet to improve safety in 1991. The proposed action in this EA is to widen the remaining 5 miles of the channel from 450 feet to its authorized width of 600 feet. The purpose of the project is to increase the efficiency and safety of the Port of Baltimore by widening the Brewerton Channel Eastern Extension. The dredging requires the removal of approximately 2,500,000 cubic yards of material and includes 2 feet of advanced maintenance dredging and 2 feet of allowable overdepth dredging. Annual shoaling is expected to be approximately 69,300 cy. The State of Maryland has designated the Hart-Miller Island containment facility for the deposition of the dredged material. Figure 1 is a map of the proposed dredging and placement area. Figure 2 shows the project location and the route from the C&D canal. Figure 3 shows the Brewerton Channel and Brewerton Channel Eastern Extension Figure 4 is a detailed drawing of the HMI placement site.(Appendix II).

The proposed methods of dredging and the placement of material are addressed and supported in, and are consistent with, the Final Environmental Impact Statement and accompanying Supplemental Information - Operation & Maintenance of Baltimore Harbor & Associated Channels, Maryland & Virginia, filed with the Council on Environmental Quality on January 10, 1975, and January 9, 1976, respectively; the Final Environmental Impact Statement for the Hart Miller Island Diked Disposal Area, filed with the Environmental Protection Agency in 1974; the Final Environmental Impact Statement - Proposed Plan for Completing the Navigation Improvements, Authorized by the 1958 River and Harbor Act for the Baltimore Harbor and Channels, Maryland and Virginia, filed with the Environmental Protection Agency on November 21, 1979; and the supplement to the General Design Memorandum and Supplemental Information Report for Baltimore Harbor and Channels

Maryland and Virginia 42-Foot Project, filed with the Office of Federal Activities on June 23, 1986. The FEIS - Proposed Plan for Completing the Navigation Improvements and the supplement to the General Design Memorandum and Supplemental Information Report for Baltimore Harbor and Channels specifically addresses deepening and widening at the Brewerton Channel Eastern Extension from 27 feet deep and 400 feet wide to 35 feet deep and 600 feet wide. The above-cited documentation is incorporated by reference into this Environmental Assessment (EA). The same environmental documentation is available from the U.S. Army Corps of Engineers, Baltimore District, CENAB-PL-C, P.O. Box 1715, Baltimore, MD 21203-1715.

This EA was prepared in accordance with the provisions of the National Environmental Policy Act (NEPA), Council on Environmental Quality Regulations (40 CFR 1500-1508) and, U.S. Army Corps of Engineers Regulations (33 CFR 230) "Procedures for implementing NEPA".

## **1.0 PURPOSE AND NEED OF THE PROPOSED ACTION**

### **1.1 PROJECT PURPOSE**

The Brewerton Channel Eastern Extension is a key link in the channel system leading from the Port through the Chesapeake and Delaware Canal. Ninety-eight percent of the vessels using the C&D canal use the Brewerton Channel Eastern Extension. The State of Maryland requests that the Brewerton Channel Eastern Extension be constructed to its authorized depth so that vessels will no longer have to wait for vessels to clear the channel or encounter a 1-1/4 hour delay by having to transit an additional distance of 12.2 nautical miles when a course to the south is made to and from Baltimore Harbor. The proposed action, which is to dredge 5 miles of the channel to the authorized width of 600 feet will complete authorized construction for the project thereby improving navigation safety and providing significant economic benefits.

In recent years, the MPA has worked towards maintaining the Port of Baltimore as a thriving world-class port. Since 1980, over one-half billion dollars has been invested in maritime-related improvements. As the commercial shipping industry continues to grow, the Port of Baltimore is anticipated to expand to meet the demands of the market.

Figure 1 is a map of the proposed dredging and placement area. Figure 2 shows the project location and the route from the C&D canal. Figure 3 shows the Brewerton Channel and Brewerton Channel Eastern Extension. Figure 4 is a detailed drawing of the HMI placement site. (Appendix II).

## **1.2 AUTHORITY**

The River and Harbor Act of 3 July 1958 authorized the deepening of the main approach channels to Baltimore Harbor from 39 feet to 42 feet and the deepening and widening of the connecting channels to the Chesapeake and Delaware Canal (C&D) from 27 feet to 35 feet deep and from 400 feet to 600 feet wide. The connecting channels are comprised of the Brewerton Channel Eastern Extension, and the Tolchester and Swan Point Channels. In addition, the project authorized maintenance of a 39-foot depth in the Northwest Branch, provided that local interests first deepen the channels to that depth. All of the improvements authorized by the 1958 Act have been constructed with the exception of widening the Brewerton Channel Eastern Extension from 450 feet to 600 feet.

## **1.3 PROJECT AREA**

The Brewerton Channel Eastern Extension is approximately 15 miles from Baltimore. The Hart Miller Island placement site is at the mouth of the Back River, approximately 14 miles east of Baltimore. Figure 1 is a map of the proposed dredging and placement area. Figure 2 shows the project location and the route from the C&D canal. Figure 3 shows the Brewerton Channel and Brewerton Channel Eastern Extension. Figure 4 is a detailed drawing of the HMI placement site. (Appendix II).

## **2.0 DESCRIPTION OF THE PROPOSED ACTION**

The proposed action consists of performing new work dredging to widen approximately 5 miles of the Brewerton Channel Eastern Extension from 35 feet deep and 450 feet wide to its authorized project width of 600 feet, as authorized by the River and Harbor Act of July 3, 1958.

Approximately 2,500,000 cubic yards of material consisting primarily of mud, silt, sand, shell, and mixtures thereof would be dredged by clamshell and scow, hydraulic pipeline, and/or hopper dredge. The State of Maryland will provide the 800 acre North Cell of the 1,140-acre Hart-Miller Island dredged material containment facility located in the upper Chesapeake Bay near the mouth of Back River in Baltimore County for the deposition of material from the proposed dredging. The proposed widening is estimated to increase annual routine maintenance dredging of the Brewerton Channel Eastern Extension by 69,300 cy or 20 percent above the present. In order to maximize drying and consolidation of the material at Hart-Miller Island, dredging will be scheduled to take place between October and March. Identification and screening of placement sites for future operations and maintenance dredging has been initiated.

CORPS OF ENGINEERS

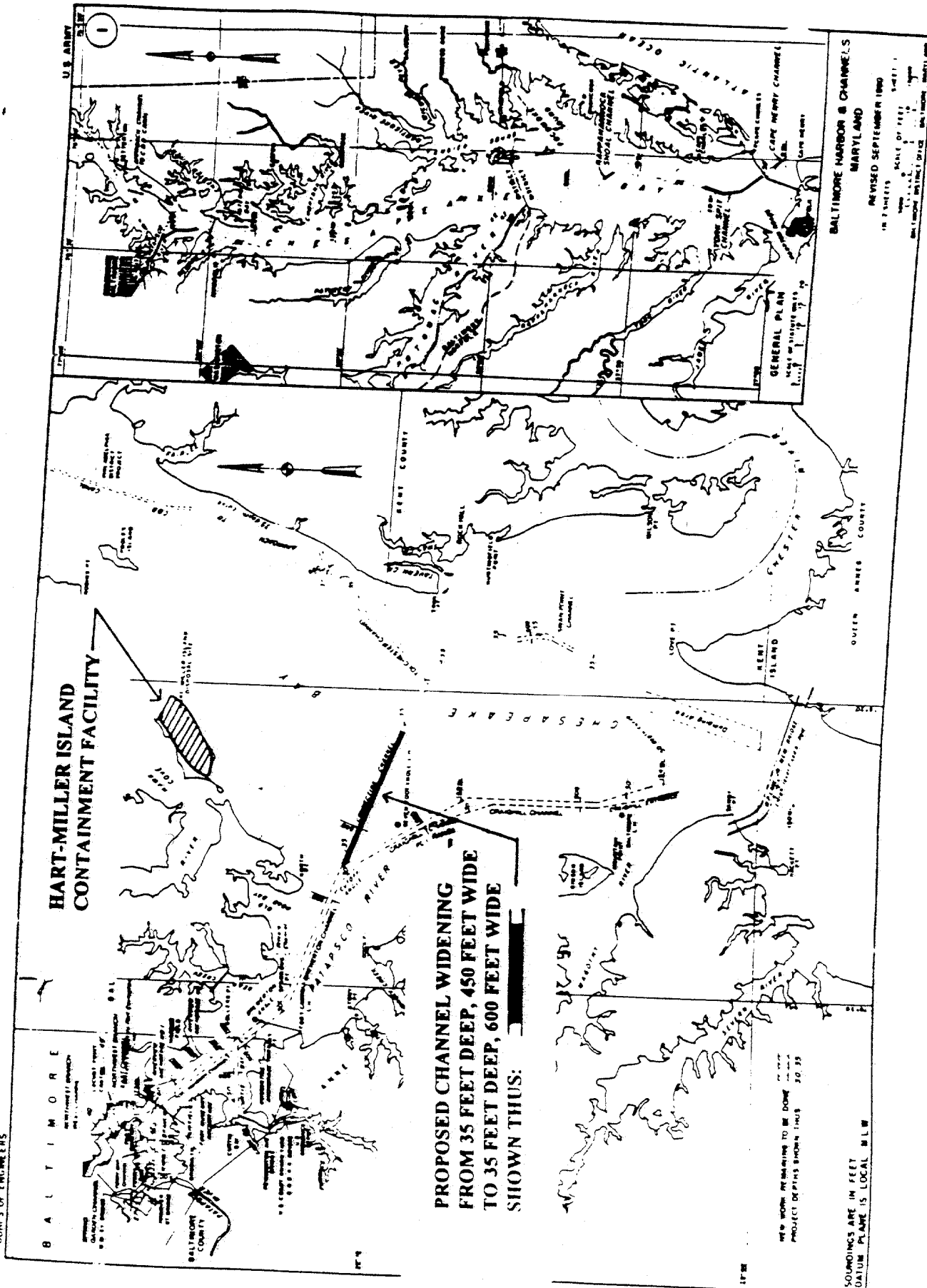
B A L T I M O R E

HART-MILLER ISLAND  
CONTAINMENT FACILITY

PROPOSED CHANNEL WIDENING  
FROM 35 FEET DEEP, 450 FEET WIDE  
TO 35 FEET DEEP, 600 FEET WIDE  
SHOWN THUS:

NEW WORK INDICATED TO BE DONE  
PROJECT DEPTHS SHOWN INSIDE 30.35

SOUNDINGS ARE IN FEET  
DATUM PLANE IS LOCAL M.L.W.



BALTIMORE HARBOR & CHANNELS  
MARYLAND

REVISED SEPTEMBER 1960  
IN FINEST

SCALE OF FEET 1:50,000  
NAVY DISTRICT OFFICE BALTIMORE, MARYLAND

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## **2.1 COMPLETED AND ONGOING PROJECTS**

The Baltimore District, U.S. Army Corps of Engineers, currently maintains the Brewerton Channel Eastern Extension Federal navigation channel. The River and Harbor Act of 3 July 1958 authorized the deepening of the main approach channels to Baltimore Harbor from 39 feet to 42 feet and the deepening and widening of the connecting channels to the Chesapeake and Delaware Canal (C&D) from 27 feet to 35 feet deep and from 400 feet to 600 feet wide. The connecting channels are comprised of the Brewerton Channel Eastern Extension, and the Tolchester and Swan Point Channels. In addition, the project authorized maintenance of a 39-foot depth in the Northwest Branch, provided that local interests first deepen the channels to that depth. All of the improvements authorized by the 1958 Act have been constructed with the exception of the Brewerton Channel Eastern Extension. The Brewerton Channel Eastern Extension, which has an authorized depth of 35 feet and width of 600 feet, was constructed to a depth of 35 feet and width of 450 feet in 1986. The eastern end of the Brewerton Channel Eastern Extension was widened from 450 feet to 600 feet to improve efficiency and safety in 1991.

## **3.0 ALTERNATIVES CONSIDERED**

### **3.1 THE "NO ACTION" ALTERNATIVE**

The no-action alternative would not achieve the objective of providing full safe navigational use of the area to commercial vessels and would not increase shipping efficiency at the Port of Baltimore. The existing channel would be maintained at its current widths and depth. Commercial shippers would delay their transits or use alternate channels, which would not be as safe or cost effective.

### **3.2 ALTERNATIVE CHANNEL DIMENSIONS**

An analysis was performed by the Baltimore District, U.S. Army Corps of Engineers, to select the appropriate channel dimensions using criteria specified in EM 1110-2-1613, "Hydraulic Design of Deep-Draft Navigation Projects" and the Waterways Experiment Station performed ship simulation studies. These analyses yielded the recommended channel dimensions proposed in this EA. These simulation studies may be found in the LRR Appendix B.

Alternative channel widths of 500, 550, and 600 feet were evaluated using simulations to optimize the channel width for two-way traffic. Preliminary simulations using the 500 foot width resulted in numerous groundings. Consequently, the 500 foot width was dropped from consideration. Analyses indicate that the average bank clearances, particularly on the south side during ebb currents and on the north side during flood currents. Also, ship clearances were very low in the 550-foot channel. Since the bank clearance and ship clearance values were higher in the 600-foot channel, the 600-foot channel was recommended as the safer alternative.

### 3.3 ALTERNATIVES FOR DREDGED MATERIAL PLACEMENT

#### 3.3.1 Overview of Placement Site Activities

The management of dredged material is an ongoing concern for the Port of Baltimore as the need for larger and deeper channels creates a greater demand for identification and development of dredged material confined placement sites. Currently, alternatives for dredged material placement are limited. In response to the need for placement sites, the Maryland Port Administration (MPA), and the Corps of Engineers are developing alternative dredged material placement areas to accommodate both current and future dredging projects. For example, the MPA developed a Master Plan to identify dredged material placement alternatives for sediments removed from Baltimore Harbor. The plan identifies dredged material placement options that were selected based on the results of a two-phase screening process. These sites were chosen to meet the harbor's placement needs in a cost-effective and an environmentally acceptable manner. The MPA is currently pursuing various options for the management of dredged material through their Dredging Needs and Placement Options Program (DNPOP). The goal of this program is to identify sites for the placement of dredged material from construction and maintenance of projects under the jurisdiction of the MPA. The program identifies short-term capacity shortfalls as well as long-range alternatives for dredged material placement. The DNPOP is not intended to be a one-time study effort to develop a fixed plan, but is a program that is constantly changing to meet the dynamic needs of the Port of Baltimore.

The MPA and the USACE are working closely to develop a multi-phased study to culminate in the Dredged Material Management Plan (DMMP). The objective of this study is to identify placement capacity for the next 20 to 50 years. Plan formulation was initiated in Fiscal Year 1995, and will include consideration of all dredging maintenance and construction of Federal projects, as well as state and private projects. The study will focus on long-term solutions and beneficial uses of dredged material. Recommendations from this study are expected within 2 to 3 years. -

#### 3.3.2 Recent Coordination Efforts

##### Governor's Task Force - 1990

In July 1990, Maryland Governor William Donald Schaefer convened a task force to review dredged material management options. The membership of the task force was broadly based, representing State, Federal, and local governments, members of the academic community, groups concerned with protection of the environment, parties involved in maritime commerce, and parties whose livelihood is dependent upon the quality of Bay waters. In the February 1991 report of its recommendations to the Governor, the task force noted the following:

*The Chesapeake Bay, one of the country's most valuable natural treasures, remains a highly productive resource even after centuries of intensive use. It contributes significantly to Maryland's economy. Its waters supply millions of pounds of seafood and play an important role in Atlantic Coast fisheries.*

*It provides extensive habitat for wildlife. It is a nesting area for endangered species such as the bald eagle. The Bay also offers a wide variety of opportunities for recreation and tourism. In short, the Chesapeake Bay greatly enhances Maryland life....New strategies addressing the dredging issue are required to both protect and promote the recovery of the Bay and safeguard the vitality of the Port of Baltimore.*

The task force's primary recommendation was the following:

*A new, comprehensive, and integrated approach linking dredged material management, environmental issues, and community development is recommended. The foundation for this unique approach is supported by four principles:*

- *Minimization: The amount of material to be dredged, and the amount of material requiring containment should be minimized.*
- *Comprehensive Monitoring: Ongoing State and Federal water quality and sediment transport monitoring programs should be integrated with pre-, during, and post-event monitoring of dredging and placement activities. This will provide a more comprehensive assessment of environmental aspects of dredging projects.*
- *Emphasis on Beneficial Use of Dredged Materials: Material dredged from shipping channels need not be seen as spoil to be disposed—instead, it can and should be utilized as a resource. Decisions regarding placement of dredged materials should emphasize productive uses—those benefiting the environment and communities. Opportunities to use dredged materials as a marketable product should be fully explored.*
- *Use of existing placement sites and creation or designation of new sites: Conventional means of placement (containment sites, open water placement, and upland placement sites) will be required to accommodate both short- and long-term demand for placement of dredged materials.*

Subsequent to the task force report and MPA Master Plan, the MPA developed the Dredging Needs and Placement Options Program (DNPOP). The program, like the task force, is a multigovernmental program charged with developing a comprehensive dredged material management plan. The objective of the program is to identify and develop near-term to long-term dredged material placement options for the Port of Baltimore and its approach channels. These include the Baltimore Harbor channels (those channels that lie inside the North Point to Rock Point line); the Bay Channels, which include the Brewerton Extension, the Tolchester and Swan Point channels, and the southern approach from the Craighill Entrance to the Cutoff Angle; the C&D Approaches, which include those channels from Pooles Island north to Courthouse Point; and the C&D Canal, which includes those channels from Courthouse Point to Reedy Point.

**Table 3.1**  
**Summary of Potential Placement Sites**

<b>Sites:</b>	<b>Sollers Point</b>	<b>Masonville</b>	<b>Thoms Cove</b>	<b>Deep Trough</b>
<b>Type:</b>	Land Creation	Modify, expand	Modify, expand	Open water
<b>Acres:</b>	90	200	380	
<b>Adjacent Activities:</b>	Wetland, Highway	Harbor, Highway	Industrial	Open water, residential on nearby shore.
<b>Distance from Shoreline:</b>	0	0	0	1 mile
<b>Dredge Capacity (Est.):</b>	4 million cy (Mcy)	3 Mcy	5 Mcy	>200 Mcy
<b>Distance from Brewerton Ext.:</b>	9 miles	14 miles	9 miles	16 miles
<b>Current Status:</b>	Small capacity.	Active and nearly full.	Tidal and non-tidal wetlands involved in filling in cove.	Prohibited by state law.
<b>Sites:</b>	<b>CSX Property</b>	<b>Cox Creek Property</b>	<b>Patapsco River Mouth</b>	<b>Hart Miller Island N. Cell</b>
<b>Type:</b>	Modify, expand	Modify, expand	Land Creation	Confined
<b>Acres:</b>	72	61	1,000-2,210	800
<b>Adjacent Activities:</b>	Wetland, industrial	Wetland, industrial	Open water, residential on nearby shore.	Open water, residential and recreation on nearby shore
<b>Distance from Shoreline:</b>	0	0	1 mile	1 mile
<b>Dredge Capacity (est.):</b>	3.2 Mcy	2.8 Mcy	50-100 Mcy	100 Mcy
<b>Distance from Brewerton Ext.:</b>	7 miles	8 miles	4 miles	6 miles
<b>Current Status:</b>	Purchased by MPA. Ready by 1997.	MPA negotiating purchase.	Close to residential area. Will affect small boat area.	Available

<b>Sites:</b>	<b>Pooles Island</b>	<b>Poplar Island</b>	<b>Kent Island Deep (Site 104)</b>	
<b>Type:</b>	Open water	Beneficial use	Open water	
<b>Acres:</b>	Open water	1,100		
<b>Adjacent Activities:</b>		Open water, residential on nearby shore.	Open water, residential on nearby shore.	
<b>Distance from Shoreline:</b>	2 miles	2 miles	1 mile	
<b>Dredge Capacity (est.):</b>		38 Mcy	18 Mcy	
<b>Distance from Brewerton Ext.:</b>	11 miles	28 miles	10 miles	
<b>Current Status:</b>	Limited capacity is reserved for Southern approach channels to the C&D Canal	Not constructed	Under review	

The September 1996 Governors Action Plan for Dredged Material Management is the most recent plan to provide dredged material placement capacity for the State of Maryland. The plan includes the options listed below:

- Expand use of open water placement sites by Pooles Island.
- Raise north cell dike system at Hart-Miller Island.
- Restore Poplar Island (Phase I: 640 acres).
- Reactivate CSX/Cox Creek Containment Cells.
- Establish open-water sites for near-term placement of dredged material.
- Construct new upper bay containment site with beneficial use component.

The MPA is raising the HMI North Cell dikes to 44 feet. Implementation of the other above initiatives involves (1) the completion of environmental documentation, (2) public review, and (3) the MPA's obtaining applicable permits from the Corps of Engineers and state agencies, and or (4) construction of the sites.

### 3.3.3 Description of Alternatives Placement Sites Considered

The following placement sites were evaluated and are described below.

- (a) Hart Miller Island (selected alternative)
- (b) Cox Creek and CSX sites
- (c) Deep Trough

- (d) Kent Island Deep (Site 104)
- (e) Pooles Island Open Water Site
- (f) Poplar Island
- (g) Patapsco River Mouth
- (h) Masonville
- (i) Sollers Point
- (j) Worton Point
- (k) Thoms Cove
- (l) Open -water placement (General)
- (m) Beneficial use (General)

### 3.3.3 a Hart-Miller Island (HMI) - Designated Placement Site for Proposed Dredging.

#### Description

Since 1984, Hart-Miller Island (HMI) has been used for placement of dredged material removed from Baltimore Harbor. The MPA is increasing the dike height of the north cell to 44 feet. This would provide an additional 30 million cubic yards at an approximate placement rate of 2.5 million cubic yards per year. After the north cell reaches capacity, it will be capped with clean material and developed to provide recreational opportunities and habitat. The permit issued by the Baltimore District Corps of Engineers for the original construction of HMI stipulates that "Provision shall be made for a park combining intensive recreational facilities, low intensity use areas, open green space areas, and fish and wildlife recreational areas. Consideration shall be given to possible cultural activities on the site. As part of the open space concept, productive marshes shall be included within the project area."

Hart-Miller Island is located in the Upper Chesapeake Bay, north of the mouth of the Patapsco River. The site is approximately 14 miles due east of Baltimore City, near the mouth of Back River in Baltimore County. Construction of the placement site began in 1981 and was concluded December 1983. HMI covers 1140 acres, and has approximately 6 miles of dike and is oval shaped, approximately 2 miles long and 1 mile wide (see map 1). The sand dikes were originally constructed to an elevation of +18 foot above Mean Low Water (MLW), 164 feet wide at MLW, with 3 horizontal (H) to 1 vertical (V) outer slopes, and 5H to 1V inner slopes. The dike has a 20-foot roadbed on top, and the side slopes are protected by a revetment consisting of filter cloth on the sand dike, covered by a layer of gravel, which is covered by a layer of riprap weighing up to 8,500 pounds per stone along the sides exposed to the Chesapeake Bay. The original 18-foot-high dikes were raised an additional 10 feet to a height of 28 feet above MLW during the summer and fall of 1988 to provide additional capacity for the expedited completion of the 50-foot deepening project. The 1140 acre oval placement site holds approximately 62 million cubic yards of dredged material to an elevation of 25 feet. The +28 foot raised portion of the dike has 2H:1V outer slopes, 3H:1V inner slopes, with a 10-foot roadbed on top. As dredging operations began in May 1984, cost-sharing legislation for the 50-foot project, the primary reason that HMI was constructed, was tied up in Congress. As a result, approximately 16 million cubic yards of material was placed in the facility from other navigation projects crucial to keeping the Port of Baltimore viable, before the 50-foot project could be initiated. Approximately 8 mcy of this material is considered to be clean.

The site has been divided into two cells. The south cell crust management and grading program has been underway since October 1990 to prepare a foundation for recreational development. To facilitate restoration of the approximate 300-acre south cell, a 10-foot surface layer of clean material has been placed at the surface of the cell.

### Geology

The Maryland Geological Survey has completed an extensive review of the geological history of HMI. The following are excerpts from their memoranda on the subject as quoted in the 1976 FEIS:

"A generalized theory for the origin of the islands is that the islands are erosional remnants of a Patapsco River neck extension. It is safe to assume that the islands were a peninsula extending out into the mouth of Back River with time, the daily activity of waves and currents eroded the peninsulas at different rates, maximum erosion at weak points and minimum erosion at strong points. The sub-surface geology of the islands indicates a clay lens approximately 60 feet thick with surrounding and underlying sands and gravels. The erodibility of the clay is far less than sands and the resultant effect is differential erosion and island formulation."

### Hydrogeology

Water depths adjacent to HMI on the Chesapeake Bay side average 15 feet. The water is brackish, with salinity ranging from 8 to 12 parts per thousand (ppt).

### Terrestrial Ecosystem

#### Vegetation

Pines, sycamore, and maple have been planted around the dikes, as have coastal panic grass, Blackwell switch grass, and weeping love grass. The dredged material at HMI has not been fully dewatered. Common reed (*Phragmites australis*), which colonizes disturbed soils, is established at HMI South Cell. This species is not considered good habitat because of its thick underground and aboveground growth. However, it provides cover, a small amount of food resources and contributes to water quality benefits. *Phragmites* control measures have been undertaken by MPA.

#### Avian Resources

In the northern portion of the Chesapeake Bay, one of the most limited avian habitats is shallow water habitat for wintering waterfowl, and shallow water and mudflat habitat for migrant shorebirds. Over the years, HMI has proven to be a significant provider of this type of habitat. At times during the operation of this facility, as many as 20,000 waterfowl have been observed using the facility. There have been significant nesting and rearing activities, which, with some operational variation and difficulty, were protected from operational impact. The mudflats and ponds at the site are a valuable resource for shorebirds. HMI has attracted over 235 observed species, including least tern, great blue heron, Canada goose,

northern pintail, blue-wing teal, northern shoveler, canvasback, scaup, mallard, ruddy duck, and others (Ringler 1992). The Maryland Ornithological Society has stated that the facility at times has supported the largest single concentration of waterfowl in the mid-Atlantic Region. Birds identified from 1977-1991 are in Appendix III. A colony of approximately two dozen great blue herons is reported at Hart-Miller State Park. Occasionally a bald eagle is sighted, although eagles are not known to nest at HMI. Barn owls, ospreys, and whet owls have been identified.

### Terrestrial Resources

Mammals have not been encouraged by the deliberate creation of mammal habitat. Mammals at HMI include red fox, muskrat (Hart Island only), raccoon, occasional white-tail deer, and field mice. Reptiles reported at the site include water snakes (*Natrix* (sp.)), black snakes (sp.), and snapping turtle.

### Aquatic Ecosystems

HMI provides habitat by providing about 19,000 feet of reef-type habitat for the attachment of algae, seaweed, and crustaceans. The site is not a recognized spawning or breeding ground for commercially important or unique fish or shellfish, although the outfalls are popular fishing areas. Fish inhabiting the project area are shown in Appendix III.

The HMI Exterior Monitoring Technical Review Committee (TRC) reported to MPA in January 1996 that, based on annual monitoring performed for 14 years at HMI, there has been no significant observed impact to the benthic community or to benthic populations. The HMI TRC also reported that a fluid mud layer was created as a result of the initial construction of the HMI perimeter dike. The mud layer was observed to extend from 525 to 1,090 yards from the perimeter of the facility. Changes in the benthic biota accompanied the occurrence of this mud layer. However, recovery of the benthic population was observed in subsequent years.

### HTRS

In 1996, the Baltimore District coordinated a search of Federal and state environmental databases for CERCLA and RCRA sites. The results of these investigations for Brewerton Channel Eastern Extension and HMI indicate that there are no RCRA or CERCLA sites in the Brewerton Channel Eastern Extension or the HMI area.

### Noise

Noise at HMI originates from equipment on-site and from vessels traveling to and from the site. Citizen concern regarding noise is based on noise from boats carrying project crews to and from the site. Tests indicate that the noise is within recognized safety levels.

### Odors

Prior to and during construction, citizens were concerned that the project would create offensive odors that would be noticeable at their homes and residences. This has not been the case, and MPA has indicated that it receives no complaints related to odors generated at the site.

### Cultural Resources

Cultural investigations were conducted for the preparation of the Final Environmental Impact Statement - Proposed Plan for Completing the Navigation Improvements authorized by the 1985 River and harbor act for the Baltimore Harbor and Channels, Maryland and Virginia, completed in November 1979 by the Baltimore District. In a letter dated June 26, 1996, the Maryland Historical Trust indicated that no further aquatic cultural investigations are necessary for Brewerton Channel Eastern Extension or HMI. Cultural investigations for HMI have indicated that use of the site would produce no significant adverse impacts to cultural resources.

### Aesthetics

Prior to construction of the HMI facility, citizens were concerned about the potential impact the project could have on aesthetic resources in the area. Concerns were expressed regarding the blocking of views and the impact of the project on aesthetic resources in the area. This issue is still a concern to individuals and to citizens groups. To make the site more attractive, the MPA is committed to planting and landscaping.

The 1976 EIS states that the HMI project will be used for recreation. The Hart-Miller State Park is a well recognized and appreciated State recreational facility, as evidenced by the presence of approximately 1,000 boats from which visitors enjoy the beach on any given summer weekend. On the Back River side of the facility, a 3,000-foot beach connecting the Hart and Miller Islands is maintained as a public park by the Maryland Park Service. Fishing is permitted around the bayside perimeter of the dike, with the exception of dredged material unloading areas. Recreational projects completed include beach nourishment, first-aid and comfort stations, and a boardwalk on Hart Island. The state has initiated a feasibility study for long-term recreational development of the approximately 300-acre south cell. The Corps of Engineers Waterways Experiment Station (WES) and the Baltimore District have developed a conceptual plan for the development of the south cell.

### Rare, Threatened, and Endangered Species

There are no known Federal- or state-listed threatened or endangered species at HMI except for occasional transient individuals.

### Permits and Monitoring

Environmental monitoring at the facility has been going on since before construction began in 1981. Several different environmental permits control the operations. Information on

permits is given below. The number of State and Federal agencies administering permits require that the owners and operators of HMI expend every effort to ensure that the facility is operated in an environmentally sound manner.

A State Discharge Permit, issued by the Maryland Department of the Environment, controls and regulates the quality of effluent discharged from the facility and sets monitoring requirements. This permit has been modified to allow raising of the dikes to 44 feet.

Each of the five outfalls at HMI is permitted as a point source discharge, with monitoring requirements and discharge limitations for pH, total suspended solids (TSS), and five metals. In the first 7 years of operation, there were a total of 10 violations of discharge permit limits. None of these violations has been for toxic parameters. No violations have occurred since 1991.

There are additional monitoring requirements for one specific outfall that requires the analysis of over 120 other potential contaminants on a quarterly basis. This quarterly monitoring is also repeated in adjacent Bay waters. Aquatic toxicity testing of the effluent is performed every 6 months.

A Wetlands License issued by the Board of Public Works sets guidelines for development into a recreational area and requires monitoring of the effects of operations on the environment and on resources outside the facility. This permit has been modified to allow raising of the dikes to 44 feet. This monitoring is performed by principal investigators from the University of Maryland and the Maryland Geological Survey under contract to the MPA. The monitoring efforts were supervised by DNR, and are presently supervised by MDE.

The Wetlands License also requires that the operator monitor wells in the dike of the facility. This is done on a monthly basis and is reported to the Hart Miller Island Technical Review Committee (HMI TRC).

An Army Corps of Engineers Construction Permit contains requirements and oversight provisions for construction and development activities on the site. Corps personnel also perform inspection duties during Federal projects to ensure operational requirements such as freeboard limitation (maintaining a 2-foot separation between the slurry elevation and top of the dike) are enforced. This permit has been modified to allow raising of the dikes to 44 feet.

A Water Quality Certification, issued by the Department of Natural Resources in 1975 (now regulated under the Maryland Department of the Environment), ensures that construction and operations are performed in accordance with the Corps of Engineers approved plans and Maryland water quality standards. This regulation requires the permit holder to provide adequate sediment erosion control, to prevent fuel spills into the waterway, and to develop crust management techniques and a water quality monitoring system.

A Water Appropriations Permit, issued by the Department of Natural Resources, allows withdrawal of water from the Chesapeake Bay. At HMI, water is used by hydraulic unloaders during inflow of dredged material and at dredging sites where hydraulic dredges are used. Semi-annual reports are submitted on water used during the previous 6 months.

### 3.3.3.b CSX/Cox Creek.

This site is specifically designated for "contaminated" material from the Inner Harbor channels. The MPA has indicated that the CSX and Cox Creek placement areas are currently designated for projects resulting from the Baltimore Harbor Anchorages and Channels study and other sites within Baltimore Harbor, rather than for material from the Brewerton Channel Eastern Extension; the Brewerton Channel Eastern Extension material would be dredged from outside of the North Point to Rock Point line and by state law can be placed outside of Baltimore Harbor. The CSX and Cox Creek sites are capable of accepting material that could be placed in HMI (the designated site for this project) and are part of the overall placement plans of the MPA. They will be briefly described although they will not be constructed in time for the proposed dredging, and are not large enough to contain the dredged material without overwhelming the site.

The CSX and Cox Creek placement sites are located approximately 1 mile south of the Francis Scott Key Bridge, on the west bank of the Patapsco River, near Foreman's Corner in Anne Arundel County, Maryland. The MPA plans to raise the dikes at these sites to 39 feet, which will provide combined capacity of 6 million cubic yards (cy) of material. Both of these sites are former dredged material placement sites that were constructed by the Corps of Engineers for deepening the main channels from 39 to 42 feet during the 1960's.

The CSX placement cell was constructed in the mid-1960's, and has been used periodically by non-Federal interests for dredged material placement. The site was purchased by the State of Maryland in July 1993. The cell was previously permitted for placement of material obtained from dredging operations in the Patapsco River and Baltimore Harbor areas. The total area of the site is 206 acres; the dredged material placement cell is 72 acres. The dikes have been raised periodically as the cell has reached capacity. The last reported use of the site for the placement of dredged material was in 1984. The MPA is currently pursuing efforts to prepare the site for future operation and is also involved in negotiations to purchase the 61-acre Cox Creek site.

Most of the CSX site is vegetated with a diverse and locally dense community of trees, shrubs, and ground cover. Areas of ponded water and marsh are found primarily across the center of the site along Swan Creek. The 134 acres of the CSX site that will not be used for dredged material placement include 69 acres of wetlands plus additional wildlife habitat. These existing wetlands are not expected to be impacted by the proposed project and will be protected for conservation purposes. Some portion of the remaining land at the CSX site (up to 72 acres) may be used as a staging area for operating equipment and personnel during material placement.

The Cox Creek Lagoon property, as it is formally known, is bordered on the west by the Cox Creek Plant property and on the east by the Patapsco River. The site is surrounded by dikes that were constructed to a height of 15 feet MLLW. The site was originally developed in the mid-1960's; however, it has not been actively used as a placement site since that time. Roughly 15 acres of the Cox Creek property is occupied by an existing lagoon or pond. The lagoon receives water in the form of precipitation and storm-water runoff from the Cox Creek Refining Company, which is adjacent to the lagoon property on the west side. The

lagoon is not open to tidal interaction; it is served by a permitted spillway for release of stormwater runoff into the Patapsco River. The local sponsor will be required to obtain permits from the COE and the MDE and has met with the Baltimore District to facilitate the permitting process. Additional chemical analysis may be necessary to meet Federal water quality standards and other non-Federal standards.

The terrestrial community at the Cox Creek and CSX placement sites is limited by the almost monotypic community of common reed (*Phragmites australis*) and a small number of cattails (*Typha* sp.) around the perched intermittent ponds. The following animals have been observed at or may be expected to inhabit or utilize one or both of the proposed placement sites:

#### Mammals

muskrat (*Ondatra zibethicus*)  
raccoon (*Procyon lotor*)  
Eastern cottontail (*Sylvilagus floridanus*)  
gray squirrel (*Sciurus carolinensis*)  
deer mouse (*Peromyscus maniculatus*)  
red fox (*Vulpes vulpes*)  
meadow vole (*Microtus pennsylvanicus*)  
white-tail deer (*Odocoileus virginianus*)

#### Amphibians and Reptiles

green frog (*Rana clamitans*)  
Southern pickerel frog (*Rana palustris*)  
black rat snake (*Elaphe obsoleta*)  
American toad (*Bufo americanus*)  
Fowlers toad (*Bufo woodhousei*)

#### Avians

herring gull (*Larus argentatus*)  
song sparrow (*Melospiza melodia*)  
red-wing blackbird (*Agelaius phoeniceus*)  
great blue heron (*Ardea herodias*)  
green heron (*Butorides striatus*)  
Carolina wren (*Thryothorus ludovicianus*)  
American crow (*Corvus brachyrhynchos*)  
starling (*Sturnus vulgaris*)  
common grackle (*Quiscalus quiscula*)  
house sparrow (*Passer domesticus*)  
slate colored junco (*Junco hyemalis*)  
white throated sparrow (*Zonotrichia albicollis*)

Aquatic Ecosystems. The Cox Creek and CSX proposed placement sites are located in an area referred to as the Outer Harbor. The following aquatic resources could be expected to be found in juvenile or adult stage at the Outer Harbor:

Fish

tidewater silverside (*Membras martinica*)  
northern pipefish (*Syngnathus fuscus*)  
white perch (*Morone americana*)  
stripped bass (*Morone saxatilis*)  
yellow perch (*Perca flavescens*)  
bluefish (*Pomatomus saltatrix*)  
silver perch (*Bairdiella chrysura*)  
spot (*Leiostomus xanthurus*)  
Atlantic croaker (*Micropogon undulatus*)  
naked goby (*Gobiosoma boscii*)  
summer flounder (*Paralichthys dentatus*)  
winter flounder (*Pseudopleuronectes americanus*)  
hogchoker (*Trinectes maculatus*)  
American eel (*Anguilla rostrata*)  
blueback herring (*Alosa sapidissima*)  
American shad (*Alosa sapidissima*)  
Atlantic menhaden (*Brevoortia tyrannus*)  
gizzard shad (*Dorosoma cepedianum*)  
bay anchovy (*Anchoa mitchilli*)  
banded killifish (*Fundulus diaphanus*)  
mummichog (*Fundulus heteroclitus*)

The USFWS has indicated that no Rare, Threatened, or Endangered species are known to inhabit the sites.

3.3.3.c Deep Trough.

The Deep Trough is a large region of deep water, up to 140 feet in depth, along the eastern shore of the Chesapeake Bay. The trough extends approximately 20 miles beginning offshore of Kent Island and extending south to the Little Choptank River. The portion of the trough located north of the Chesapeake Bay Bridge is a former dredged material placement site. The site has a potential dredged material placement capacity in excess of 200 million cubic yards. Evaluations performed have indicated that the ecological value of the area is not significant because of the lack of dissolved oxygen during the summer months, which suffocates the benthic communities. Although the sediments are recolonized during the winter, the benthic community never recovers to a point where it would become a significant resource to organisms that feed on benthic invertebrates.

In 1991, the state legislature amended Title 8, section 8-1602, of the Annotated Code of Maryland to prohibit the placement of material in the Deep Trough. Subsection (d) now reads as follows:

*(d) Material excavated from Bay. - A person may not dump, deposit, or scatter any earth, rock, soil, waste matter, muck, or other material excavated or dredged from the Chesapeake Bay or its tidal tributaries into or onto the area of the bottomlands or waters of the Chesapeake known as the Deep Trough.*

Although some previous reports suggest that placement of material at the Deep Trough is environmentally acceptable and is a cost-effective dredged material placement alternative, the existing state law essentially prohibits the required participation by the local sponsor.

#### 3.3.3.d Kent Island Deep (Site 104).

A large placement site off Kent Island was used for dredged material for more than 50 years, ending in 1975. For the last 3 decades of that period, most dredged material from maintenance of the Federal channels within Baltimore Harbor and from Federal channels in the Bay leading to Baltimore Harbor was placed at this site. Records for the period are not complete, but suggest that more than 70 million cubic yards of dredged material was placed at the site during the 30-year period ending in 1975. These dredged sediments resulted from construction to widen and deepen the project channels (at least 44 million cubic yards) and from maintenance dredging of the authorized channels (at least 26 million cubic yards).

The Kent Island Placement Site was established by the USACE in November 1924. The original placement area extended 2.7 nautical miles, from approximately 1.75 miles northwest of Love Point (Kent Island), in a south-southwestward direction along a natural deep channel of the Bay, to a position due east of the Sandy Point Light. The southern boundaries of the site were extended twice: first, in 1950, the southern boundary was repositioned almost 1 nautical mile south to latitude 39° 00' N; next, in 1960, the southern boundary was moved an additional 2,500 feet to the south to a line running parallel to and 2,000 feet north of the Bay Bridge, and the southern 1.1 nautical miles of the site were widened, to the west, by approximately 1,000 feet. Depths along the axis of the original site were 70 to 73 feet MLLW, and the added areas to the south had depths increasing to 95 feet MLLW. The original intent was that the site not be filled to above -50 feet MLLW, but in September 1960, this limit was relaxed to -40 feet MLLW.

In retrospect, it appears that some quantity of O&M dredged material from the Harbor was placed at the site in the early 1960's, but subsequent placement of dredged material from the approach channels to the Harbor and from new work dredging in the 1960's and 1970's covered these Harbor sediments. It is not clear that any potential contaminant-related impacts of placing Harbor sediments at the site were evaluated or measured before the sediments were covered by subsequent placement. However, concerns about the possible deleterious effects of open-water discharge of dredged material at the site led to environmental monitoring of the site and the placement of dredged material by the Maryland Department of Natural Resources (DNR) and others in the 1970's.

The last known use of the site was in 1975. From February 19 to March 17, 1975, the Baltimore District conducted maintenance dredging of the inbound (eastern) side of the Craighill Angle and the Cutoff Angle with the Corp's hopper dredge *Essayons*. About 860,000 cubic yards of sediments were excavated from the channels, transported to, and

discharged at the Kent Island site from the hopper dredge. Monitoring of the site extended from February 14 to October 31, 1975. Conclusions of the monitoring (Gross, *et al.*, 1976) are given below:

- ***Dispersion of dredged material.*** The dredged material was discharged and then settled to the bottom as a discrete mass, with little or no material reaching the surface. By, about 15 minutes after release of the material, most coarse material had settled out of the water column, leaving a plume of turbid water, a few meters thick, that was easily transported by tidal currents. After 2 hours, more material had settled, and the turbidity plume was reduced to a thin layer of turbid water very near the bottom.
- ***Benthos.*** There was no detectable mortality or change in health status for oysters, soft-shell clams, or other benthic organisms outside the site. The dredged material deposited within the site was recolonized by benthic organisms within 60 days.
- ***Fisheries and shellfisheries.*** There was no evidence of impacts to commercial fisheries or commercially important shellfish beds outside the site.
- ***Public health.*** There was no measurable degradation of water quality. Concentration of bacteria, trace metals, PCB's, and chlorinated hydrocarbons in marketable shellfish collected throughout the study show that no significant increases occurred as a result of the dredged material placement.

Though the above monitoring clearly showed that impacts of the dredged material were temporary and were confined to the placement site, no placement of dredged material occurred at this site after the subject study. Remaining site capacity to -45 feet MLLW is approximately 18 million cubic yards. Site capacity is 31 mcu to -40 feet.

The Baltimore District's FY 1996 testing of O&M sediments included three reference stations near the Kent Island site. Results of chemical analyses of surface sediments near the site does not show elevated levels of priority pollutants. Studies are being undertaken to address the feasibility of using this site. These studies will not be completed until approximately fall 1997. If the studies are favorable, then the Kent Island site could potentially be used for placement of material from the Brewerton Channel Eastern Extension.

#### 3.3.3.e Pooles Island/Pooles Island Deep/G Central/G South.

The first documented cases of in-water placement of dredged material in the vicinity of Poole's Island was during the 1936-1938 deepening (to -27 feet MLLW) and widening (to 400 feet) of approach channels to the C&D Canal. Four government-owned hopper dredges were employed to dredge approximately 24.3 million cubic yards of sediments from the channels. At least half of the dredged material, primarily from channel reaches south of Turkey Point, was placed in open water sites east of the channel.

Since 1977, routine maintenance dredging of C&D Canal Approach Channels has required in-water placement of approximately 1.2 million cubic yards of sediment annually. This dredged material has been placed in Area D, Area E, Area F, Area G, and Area H. Sediments from the northernmost reaches of the C&D Canal Approach Channels have been placed in upland containment sites.

In addition to the above, some limited use of the Pooles Island sites has been made for placement of dredged material from the approach channels to Baltimore Harbor. About 2.2 million cubic yards of sediment dredged to maintain and widen the Swan Point Channel and the Tolchester Channel was placed at Area G-Central in 1980 and 1981. Almost 1.8 million cubic yards of sediments dredged to maintain, and widen the eastern end of the Brewerton Channel Eastern Extension from 450 to 600 feet was placed at Area G-North in 1990 and 1991. In 1992 and 1993, slightly more than 2.1 million cubic yards of dredged material from the Tolchester Channel was placed in Area G-North, and over 1.4 million cubic yards of dredged material from the Craighill Entrance, the Cutoff Angle, the Swan Point Channel, and the Tolchester Channel was placed at Area G-South.

By 1993, the Philadelphia District and the MPA concluded that all of the aforesaid Pooles Island placement sites were either filled to capacity, would be filled to capacity by fall 1993, or were no longer acceptable for placement of dredged material because of potential impacts to fisheries habitat or spawning areas. To provide the needed placement capacity, the Philadelphia District and the MPA proposed placement of dredged material in a broad "U"-shaped trough between the -11 feet MLLW contours east of Pooles Island and the elongated mound resulting from placement of dredged material at the G-North and G-Central Placement Sites (Figure 5). This new site was designated "G-West." A berm to contain the hydraulically dredged sediments was constructed across the south end of the trough using mechanically dredged sediments.

About 630,000 cubic yards of sediment was used to construct the berm in February and March 1994. Capacity behind the berm was estimated at 4.2 million cubic yards in the 1993 Environmental Assessment. Based on an average of 1.2 million cubic yards a year dredged from C&D approach channels, the G-West site will be filled to capacity as early as the scheduled 1997-1998 maintenance dredging. To provide continued capacity beyond this date, Philadelphia District and MPA are proposing placement of dredged material in an area, G-East, immediately east of and adjacent to the G-North and G-Central sites. This supplemental area is estimated to provide another 4.5 million cubic yards of placement capacity.

The Baltimore District considers this site to be environmentally acceptable for placement of material from the Brewerton Channel Eastern Extension. However, given the ongoing shortage of placement capacity in the northern Bay and the continued requirements of the Philadelphia District to maintain the approach channels to the C&D Canal, the sites at Pooles Island or north of Pooles Island are expected to be reserved for placement of dredged material from the southern approach channels to the C&D Canal. Monitoring of dredged material placement at G-West has shown that impacts associated with the placement of dredged material at that site are minor, short-term, and limited to the immediate vicinity of the G-West placement site.

#### 3.3.3.f Poplar Island

Since Poplar Island, like many islands in the Chesapeake Bay, is currently eroding, it was determined that island restoration/creation could be an ideal solution to the dredged material management problem that the Port of Baltimore is facing. Offshore islands are a unique ecosystem component in the Chesapeake Bay watershed. Although similar vegetative communities may occur on the mainland, isolation, lack of human disturbance, and fewer predators make islands more desirable as nesting sites for colonial waterbirds and some endangered species.

The group of islands known as Poplar Island is located in the upper middle Chesapeake Bay, approximately 34 nautical miles southeast of the Port of Baltimore and 1 mile northwest of Tilghman, Talbot County, Maryland. A project to reconstruct Poplar Island to its approximate size in 1847 using uncontaminated dredged material from the Baltimore Harbor and Channels Federal navigation project has been developed through cooperative efforts of many state and Federal agencies, as well as private organizations. The recommended plan would create a 1,100-acre dredged material placement area within a 35,000-foot perimeter. This area would then be filled with uncontaminated dredged material obtained from periodic maintenance dredging of Federal navigation channels that serve the Port of Baltimore, and can be developed into low and high marsh wetlands and upland habitat. The projected site capacity associated with the recommended plan is 38 million cubic yards, which is expected to be placed over a period of 24 years. The site would consist of 50 percent tidal wetlands, of which 80 percent would be low marsh and 20 percent would be high marsh, and 50 percent uplands with an elevation up to +20 feet MLLW. An EIS prepared in 1996 by the Baltimore District stated that the Poplar Island site is considered environmentally acceptable for placement of maintenance material from the Brewerton Channel Eastern Extension. Poplar Island was not considered as a placement site for new material from Brewerton Channel Eastern Extension because its annual capacity is limited to 2 million cubic yards and it is not anticipated that it will be constructed in time for new construction dredging.

#### 3.3.3.g Patapsco River Mouth

Between 1975 and 1983, almost 6 million cubic yards of material dredged during the maintenance of approach channels to Baltimore Harbor was placed at a shallow-water site in the mouth of the Patapsco River (see Figure 6). State law (Subsection 8-1602.1 of Maryland Code) enacted in the mid-seventies prohibited placement of dredged material from channels upstream of the "Rock Point - North Point Line" into waters of the Chesapeake Bay; consequently, no dredged material from the Harbor was placed at this site.

Because of the relatively exposed position of the site and the shallow depths before and after placement, some material was lost from the site. About one third of the sediment placed at the site was dredged hydraulically and discharged at the site as a slurry. Material placed hydraulically was down-shunted to the bottom and was placed closer to the center of the site in order to minimize loss of material from the site. However, some of the sediment may have been lost to the water column during placement or may have been resuspended and carried from the site by wind- and wave-driven currents. Though not proven, it has been suggested that the thin, relatively clean surficial layer of sediments in the lower reaches of the Patapsco

River near the Francis Scott Key Memorial Bridge may have originated from the Patapsco River placement site. Further, the reported temporary deposition of fine-grain sediment in nearshore areas in northern Anne Arundel County might have resulted from placement of dredged material at the site. Use of the Patapsco River site for placement of dredged material ended in 1983. Because of the potentially dispersive nature of the immediate area, the site is not now considered suitable for open-water placement of dredged material. This site has been suggested as a potential area for construction of a containment facility.

#### 3.3.3.h Masonville.

The Masonville site, which is operated by MPA, is located along the southern shore of the Middle Branch of the Patapsco River off the Ferry Bar Channel. The site consists of approximately 152 acres of fast land and 175 acres of submerged land. A detailed development plan and environmental impact analysis were prepared by the MPA in 1982. The site was an important part of the harbor maintenance dredging program for the disposal of dredged material from small private jobs. Currently there are five containment cells, which are essentially full.

#### 3.3.3.i Sollers Point.

This proposed site is 90 acres in the Inner Harbor is located near the Francis Scott key Bridge, and has a small capacity compared to most other sites. The area is considered environmentally degraded. Disadvantages of using the site include the need to move large quantities of sediment and debris, loss of wetlands, and bottom material unfavorable for construction of containment dikes.

#### 3.3.3.j Worton Point.

This proposed beneficial use area is close to the southern approach channels to the C&D Canal. The shoreline is highly eroded and in need of stabilization. The site is not now considered viable because of its high environmental value and the requirements of the landowner. If the site were to become available, its capacity would be reserved for the southern approach channels to the C&D Canal.

#### 3.3.3.k Thoms Cove.

This proposed site in the Inner Harbor has a small capacity and is one of the last natural areas in the Inner Harbor.

#### 3.3.3.l Open-Water Placement (General).

Open-water placement of dredged material has been and continues to be an important component of the effort to maintain the navigation channels serving the Port of Baltimore. While each placement site needs to be evaluated independently, there is ample information to indicate that some sites known as sinks are not likely to cause long-term impacts so long as dredged material composition is similar to that of the existing sediments.

Ocean disposal of dredged material from the upper Chesapeake Bay is not considered a feasible alternative because the long hauling distance makes the cost prohibitive.

#### **3.3.3.m Beneficial Use of Dredged Material (General).**

Clean dredged material is a potentially valuable natural resource with substantial benefits if properly used. Under existing USACE policy, dredging projects are to be conducted to maximize public benefits, and beneficial uses of the dredged material are an integral component of the policy. The Baltimore District has an active program to beneficially use dredged material for wetlands restoration and other environmental purposes. Examples are restoration activities at wildlife refuges and island creation.

Sediments in the Brewerton Channel Eastern Extension are considered clean enough that they could be used for open water placement in area where fine grained material is acceptable. In many Bay locations, Brewerton Channel Eastern Extension sediments would be too fine grained for open water placement, and would have to be contained within a diked structure or geotextile tubes. The mostly likely beneficial use site for material from the Brewerton Channel Eastern Extension would be Poplar Island.

### **4.0 EXISTING CONDITIONS AND AFFECTED ENVIRONMENT**

The following section contains a description of the existing conditions. The description provides a basis for measuring impacts associated with the construction and operation of potential improvements to the Brewerton Channel Eastern Extension.

#### **4.1 PROJECT AREA DESCRIPTION**

The project area is shown on Figure 1. Brewerton Channel Eastern Extension is approximately 15 miles from Baltimore. The Hart Miller Island placement site is at the mouth of the Back River.

##### **4.1.1 Background - Port of Baltimore**

The Port of Baltimore is located on a 32-square-mile area of the Patapsco River and its tributaries, approximately 12 miles northwest of the Chesapeake Bay. The land surrounding Baltimore Harbor is highly developed. More than 43 percent of the defined area is industrial, and 7.5 percent is classified as commercial. Only 34 percent of the area consists of urban and residential land use. Water use predominantly centers on commercial shipping due to the extensive public and private port facilities and the deep-draft channel system. Other water uses include recreational boating and commercial fishing.

By the end of the Revolutionary War, Baltimore had established regularly scheduled sailing services. In the 19th century, ship building, warehouses, and piers continued to expand and multiply to meet the needs of the growing local and regional markets. By the 1830's, the Baltimore Clipper, cargo-carrying vessels, steam-powered vessels, and railroads supported

the prospering Baltimore commercial market. Beginning in the 1850's, dredging of the navigation channels enabled even larger vessels to call on the port. Continuing into the 1990's, the Port of Baltimore remains a growing commercial center.

Vessels arrive at and depart from the Port of Baltimore via the southern Chesapeake Bay (Cape Henry) route or the northern Chesapeake Bay route through the C&D Canal. Vessels using the C&D canal for passage to or from the Port of Baltimore must have a draft of 33 feet or less. Vessels with sailing drafts greater than 33 feet must use the main shipping channel (Cape Henry) route into the Port of Baltimore. This channel system was deepened to 50 feet in October 1990 as part of the Baltimore Harbor and Channels 50-Foot Project.

The Port of Baltimore is a major facilitator in the thriving Baltimore-Washington megalopolis. It is a major node in the distribution networks feeding the markets of New York; Newark, New Jersey; Philadelphia; and Washington, D.C. The port is the most inland seaport on the east coast, providing easy connections to America's industrial heartland. Baltimore also contributes to east coast markets as far north as Boston, Massachusetts, and as far south as Charlotte, North Carolina. The port of Baltimore is one of America's busiest deep-water ports. The port's 45-mile shoreline supports many modern public and private cargo terminals, which handle a wide variety of general (containerized) and bulk cargoes. Vessels calling on the Port of Baltimore include autocarriers, break bulk vessels, container vessels, dry bulk vessels, tankers, RORO (roll on-roll off) carriers, general cargo vessels, cablesips, naval ships, tugs, and tug/barge combinations. Foreign commerce is a mix of bulk, general, and specialized cargoes.

The Port is situated in a sheltered harbor and is accessible to major American and foreign ports. This combination attracts manufacturing industries profiting from the inexpensive shipment of bulk raw materials. Since the turn of the 20th century, the types of bulk commodities moving through the port have remained the same. Imports of iron ore from Chile and Canada feed Bethlehem Steel, and coal exports from West Virginia provide fuel for around the world. In addition, large flows of grain have continued to move out of the port to various global destinations. The port's proximity to Eastern and Midwestern markets is an added attraction to manufacturers. Table 1 summarizes the Port of Baltimore's top 10 trade routes in terms of commodity tonnages by route for the year 1993.

Commodities and tonnages handled through the Port of Baltimore are projected to increase steadily through the year 2010. From a 1993 total commodity flow of 22,900,000 metric tons, commodity flows through Baltimore are forecast to be 37,590,000 metric tons by the year 2010. This approximates an average annual growth in tonnage of 2.95 percent. Beyond 2010, commodity flows are projected to grow at an average annual rate of 2.93 percent by the year 2050 to a total of 118,787,000 metric tons. Major commodities expected to move through Baltimore are grain, coal and coke, lumber and plywood, iron and steel, automobiles, cement and lime, and light industrial equipment.

Table 1

**Table 1**  
**Top 10 Trade Routes for Baltimore 1993**

<u>Route</u>	<u>Metric Tons</u>	<u>Percentage of Total</u>
Baltimore to Northern Europe	3,269,002	21.0%
South America's East Coast to Baltimore	2,146,092	13.8%
Baltimore to Southern Europe	2,006,876	12.9%
Baltimore to Other Mediterranean	1,658,288	10.7%
Baltimore to Japan	1,565,546	10.1%
Baltimore to Eastern Europe	1,103,970	7.1%
Caribbean Basin to Baltimore	1,087,978	6.9%
Australia/New Zealand to Baltimore	944,086	6.1%
Northern Europe to Baltimore	904,319	5.8%
Japan to Baltimore	878,422	5.6%
<b>Total</b>	<b>15,564,579</b>	<b>100%</b>

#### **4.1.2. Existing Navigation Projects**

This study incorporates Port of Baltimore vessel movements via the existing water resource projects under the authority of the Corps of Engineers (COE), Baltimore District and Philadelphia District.

##### **4.1.2.1 Baltimore Harbor and Channels.**

The existing project for the Baltimore Harbor and Channels was adopted by the River and Harbor Act of 8 August 1917 and modified by the River and Harbor Acts of 21 January 1927, 3 July 1930, 7 October 1940, 2 March 1945, 3 July 1958, and 31 December 1970. The existing navigation project is shown in Figure 2 and 3.

The existing project includes a main channel, 50 feet deep, between Cape Henry, Virginia, and Fort McHenry at Baltimore. The authorized dimensions of the channels are as follows:

1. Cape Henry Channel: 50 feet deep and 1,000 feet wide from the 50-foot depth curve in the Atlantic Ocean to that depth in the Chesapeake Bay, a distance of 3 miles.

2. York Spit Channel: 50 feet deep and 1,000 feet wide connecting the 50-foot depth curves in the Chesapeake Bay opposite the York River near York Spit, a distance of 18.4 miles.

3. Rappahannock Shoal Channel: 50 feet deep and 1,000 feet wide connecting the 50-foot depth curves in the Chesapeake Bay opposite the Rappahannock River, a distance of 10.3 miles.

4. Craighill Approach Channel to Fort McHenry: 50 feet deep and generally 800 feet wide, widened at the entrance and bends, from the 50-foot depth curve in the Chesapeake Bay opposite the mouth of the Magothy River to Fort McHenry on the Patapsco River, a distance of 20.7 miles.

The existing project also authorizes a series of branch channels that provide access to the various public and private terminals serving the Port of Baltimore and that connect the main channel with the C&D Canal. The dimensions of the branch channels are as follows:

1. Connecting Channel to Chesapeake Bay and Delaware Canal Approach Channel: 35 feet deep, 600 feet wide, and 15.6 miles long from the Cutoff Angle in the main channel to the 35-foot depth curves in the natural channel on the east side of the Chesapeake Bay, which is part of the inland waterway from the Delaware River to the Chesapeake Bay. The channel includes the Brewerton Channel Eastern Extension and the Swan Point and Tolchester Channels.

2. Curtis Bay Channel: 50 feet deep, 600 feet wide, and 2.2 miles long from the main channel to and including a 1,275-foot-wide turning basin at the head of Curtis Bay.

3. Curtis Creek:

a. A channel 35 feet deep and 200 feet wide from the 50-foot channel in Curtis Bay to 750 feet downstream of the Pennington Avenue Bridge, a distance of 0.9 miles.

b. A channel 22 feet deep and 200 feet wide from the 35-foot channel to and along the marginal wharf of the Curtis Bay Ordnance Depot.

c. An irregularly shaped basin 18 feet deep and 320 feet wide, adjacent to the head of the 22-foot channel, a distance of 600 feet.

d. A basin 15 feet deep and 450 feet wide, from the end of the 22-foot channel to the end of the marginal wharf, a distance of 0.2 miles.

e. A channel 22 feet deep and 200 feet wide, from the 22-foot channel of the CSX Rail Transport bridge to the vicinity of Arundel Cove, a distance of 2,800 feet, then 100 feet wide in Arundel Cove for a distance of 2,100 feet,

with an anchorage basin 700 feet square adjacent to the channel and southwest of the wharf of the Coast Guard Depot at Curtis Bay.

4. Middle Branch: Ferry Bar East Section: A channel 42 feet deep and 600 feet wide, from the main channel at Fort McHenry to Ferry Bar, a distance of 1.4 miles.

NOTE: The West Ferry Bar and Spring Garden Sections of the existing project were deauthorized by Section 1001 of the Water Resources Development Act of 1986, PL 99-662.

5. Northwest Branch:

- a. East Channel: A channel 600 feet wide and 49 feet deep from the Fort McHenry channel or 1.3 miles, with a 950-foot-wide turning basin at the head of the channel.

- b. West Channel: A channel 600 feet wide and 40 feet deep for 1.3 miles, with a 1,050-foot-wide turning basin at the head of the channel.

#### Anchorages

There are four anchorages authorized under the existing Baltimore Harbor and Channels project. These anchorages are maintained by the Federal government and are regulated by the U.S. Coast Guard. The Quarantine Anchorage was authorized by the USACE. Regulation of the Quarantine Anchorage was canceled by the U.S. Coast Guard effective January 1970 due to the construction of the Francis Scott Key Bridge.

1. Anchorage # 1 Fort McHenry Anchorage: In the Patapsco River near the intersection of the Fort McHenry Channel and the Ferry Bar Channel; 35 feet deep, 3,500 feet long, and 400 feet wide.

2. Anchorages #3 (Riverview Anchorage # 1): In the Patapsco River, on the northeast side of the Fort McHenry Channel, adjacent to Seagirt Marine Terminal; 35 feet deep, 4,500 feet long, and 1,500 feet wide.

3. Anchorage # 4 (Riverview Anchorage # 2): In the Patapsco River, 3,000 feet southwest of the Dundalk Marine Terminal; 30 feet deep, 2,400 feet long, 1,200 feet wide.

4. Quarantine Anchorage: In the Patapsco River near Hawkins Point, southeast of the angle between Fort McHenry Channel and Curtis Bay Channel; 35 feet deep, 3,500 feet long, and 600 feet wide (deauthorized in 1970)

There are four other anchorages in the Baltimore Harbor which are authorized by the U.S. Coast Guard. These anchorages utilize existing depths, are shown on navigation charts, but are not maintained.

#### 4.1.2.2 Chesapeake and Delaware Canal.

The existing project for the C&D Canal is maintained under the jurisdiction of the COE, Philadelphia District. The project was adopted as House Document 63-196 in 1919 and modified by Section 3 of the Rivers and Harbors Committee Document 71-41 and Senate Document 71-151 in 1930; by House Document 72-201, House Document 73-18, and House Document 73-24 in 1935; and by Senate Document 83-123 in 1954.

The Inland Waterway Project (Delaware River to the C&D Canal and Chesapeake Bay) was initiated with the purchase of the canal by the United States in 1919. The existing project provides a channel 35 feet deep and 450 feet wide from the Delaware River through Elk River and the Chesapeake Bay to the 35-foot depth contour in the Chesapeake Bay. A feasibility study is currently being conducted by the Philadelphia District COE to investigate the feasibility of deepening the channel through the Canal and its approaches.

The project also provides for modifications to bridge crossings, including a railroad crossing with 138 feet of vertical clearance at full lift and a horizontal clearance of 600 feet; high level highway bridges with 135 feet of vertical clearance and 500 feet of horizontal clearance at Reedy Point (2 lanes), St. George's (4 lanes), Summit (4 lanes), and Chesapeake City (2 lanes); and a bascule drawbridge across the Delaware City Branch Channel.

Other improvements authorized under the existing project include extension of the entrance jetties at Reedy Point; an anchorage in Elk River, 35 feet deep, 1,200 feet wide, and an average length of 3,700 feet; enlargement of the anchorage and mooring basin in Back Creek to 12 feet deep, 400 feet wide, and 100 feet long; a branch channel 8 feet deep and 50 feet wide at Delaware City and deepening of the existing basin to 8 feet; revetment along banks of Delaware City Branch Channel east of the Fifth Street Bridge; and construction of bulkheads.

#### 4.1.2.3 Non-Federal Branch Channels.

There are several non-Federal branch channels that serve to connect the main shipping channels with various public facilities throughout the Port of Baltimore. The branch channels are generally 36, 38, and 42 feet deep and vary in width from 300 to 500 feet. The branch channels are shown in Figure 4 and include West Seagirt Branch Channel, Seagirt/Dundalk Connecting Channel, West Dundalk Branch Channel, East Dundalk Branch Channel, and South Locust Point Branch Channel and turning basin. Maintenance of these branch channels and the berthing areas is currently the responsibility of the MPA.

#### **4.1.3 Physiography**

The Chesapeake Bay was formed approximately 12,000 years ago when the last sheet of ice melted, raising the sea level and flooding the ancient Susquehanna River valley. The old riverbed formed the deep channels of the 180-mile-long Chesapeake Bay. The Chesapeake Bay is shallow, with the depth of the mainstem averaging less than 30 feet.

The Patapsco River originates near Westminster, in Carroll County, Maryland, and flows southeasterly for 65 miles to enter the Chesapeake Bay 9 miles south of Fort McHenry. The

lower 15 miles of the river are tidal. Navigation for deep draft vessels is limited to the area south of the Hanover Street Bridge, where the width of the river increases abruptly to nearly 1 mile. From this point to the mouth, the width gradually increases to about 4 miles. The total drainage area for the Patapsco River is approximately 547 square miles, with a mean discharge of 675 cubic feet per second.

#### **4.1.4 Climate**

The project area has a continental-type climate with four distinct seasons, although extreme winter and summer temperatures are moderated somewhat by the Chesapeake Bay. The average annual temperature is 62 degrees Fahrenheit (F), with the highest temperatures occurring in late July (average maximum, 89 degrees F) and the lowest temperatures occurring in January and February (average minimum, 21 degrees F). Annual precipitation ranges from 40 to 44 inches, distributed fairly evenly throughout the year. The lowest average monthly precipitation (2.57 inches) occurs in January and the highest (4.26 inches), in August. Winter low pressure systems moving up the Atlantic coast cause most of the precipitation during the cold months, while summer showers and thunderstorms provide warm weather precipitation. Average snowfall in the project area is 20 to 25 inches, mainly occurring in December, January, and February. The prevailing winds are southerly from May through September and west-northwesterly to northwesterly during the rest of the year. Hurricanes, blizzards, tornadoes, and other destructive storms are uncommon.

#### **4.1.5 Sediments**

##### **4.1.5.1 Origins**

The Chesapeake Bay is located in the Atlantic Coastal Plain physiographic province and is underlain by sequences of clay, silt, sand, and gravel. These geologically unconsolidated sediments date from the Cretaceous, Tertiary, and Quaternary Periods.

The general geologic setting of the Baltimore Harbor is comprised of a series of wedge-shaped sediment layers dipping and thickening bayward. The older and generally harder Cretaceous sediments are encountered farthest to the north and west within Baltimore Harbor, while the younger and less compact Tertiary and Quaternary sediments are typically encountered elsewhere.

While the Patapsco River is an important source of sediment that causes shoaling in the Harbor itself, the bottom sediments in the Chesapeake Bay and the Bay channels originate from other sources. The upper Chesapeake Bay is a sediment deposition zone, with the Susquehanna River as the principle source of new sediment. Sediments that shoal in the channels are comprised predominantly of local sediments, which originate through shoreline erosion, overland flow, and resuspension of material located adjacent to the channels although periodic high flows from the Susquehanna can carry sediments which shoal the channels.

#### 4.1.5.2 Sediment Composition.

The bottom sediments in the Chesapeake Bay and the approach channels to the Baltimore Harbor are predominantly clayey silt, with some occurrences of sand-silt-clay. Sediments that shoal in the Brewerton Channel Eastern Extension are composed of fine silts and clays. Due to the channel's location in the middle of the upper Chesapeake Bay and the shallow waters on either side of the channel, the primary sources of sediments are runoff from the Susquehanna river, shoreline erosion, and the resuspension of bay bottom sediments from wave action and ship energy. Sediments settling in the center of the channel typically are resuspended by ships transiting the channel, and most of the noticeable shoaling occurs in the outside quarters of the channel, and along the channel toes. Since the channel cuts across the Chesapeake Bay, it acts as a sediment trap for sediments being carried by ebb and flood currents that cross perpendicular to the channel.

Sediment samples were obtained from the Brewerton Channel Eastern Extension by the USACE in 1996. The samples were collected and evaluated for two purposes: (1) to determine dredged material placement requirements by identifying the chemical content of the sediments (environmental borings) and (2) to characterize the dredging conditions by analyzing the geophysical properties of the sediments (geotechnical borings). Sediments are composed of very soft, highly plastic, silty clay with traces of sand. Sediment samples averaged over 50 percent clay and less than 10 percent sand. Shell fragments, wood pieces, and gravel are observed occasionally in these sediments. Typically, these sediments, though suitable for open water placement, are too fine-grained to be used to create structure unless they are contained.

#### 4.1.5.3 Sediment Quality.

Sediments were analyzed to determine the chemical concentrations in accordance with the "Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. - Testing Manual (draft), U.S. Environmental Protection Agency and the Department of the Army, U.S. Army Corps of Engineers, June 1994." The test results are included in the "Data Report - FY 1995 Sediment Sampling and Chemical Analysis for Baltimore Harbor and Chesapeake Bay, Maryland, September 1996."

For the most part, the 1996 chemical analysis of sediments from core samples in the area proposed for widening and sediments from grab samples collected in the existing channel confirmed the results of earlier tests that indicated that the sediments are generally free of priority- pollutants. The sediments in the vicinity of the Brewerton Channel Eastern Extension are removed from known sources of anthropogenic contaminants and are generally free of priority pollutants. When contaminants are measured, they are generally in such low concentrations that they are unlikely to have any negative impacts on sensitive marine organisms that might come into contact with sediments. Sediments from the grab samples collected in the existing channel confirmed earlier tests.

In the 1996 testing, however, core samples (most notably BEV-3 and, to a lesser extent, grab samples) were found contaminated with detectable levels of diverse polynuclear aromatic hydrocarbons (PAHs). PAHs can occur naturally or as byproducts of combustion; examples

would be coal or burnt wood. PAH's can also occur as byproducts of diverse manufacturing and processing operations. This latter source is unlikely because of the location of the PAH's in the central reaches of the Bay.

The low levels of PAHs detected at most stations are not statistically significant when compared to the Kent Island Reference site which was chosen as a basis of comparison because it is removed from known sources of anthropogenic contaminants, and generally free of priority pollutants. Also, the Kent Island Reference Site is not considered to be present at levels prompting environmental concern. The higher values at Brewerton Channel Eastern Extension station BEV-3 are statistically significant when compared to the Kent Island Reference, but do not appear representative of most of the sediments to be dredged. Consequently, no significant adverse contaminant-related impacts are expected to result from placement of these sediments at any of the HMI, Poplar Island, and Pooles Island placement sites addressed in this report. Additional information on sediments may be found in Appendix VI.

#### 4.1.5.4 Shoaling Rates.

The shoaling at the Brewerton Channel Eastern Extension averaged approximately 247,800 cubic yards per year from 1986 to 1997. Maintenance dredging is performed approximately every 2 years with approximately 500,000 cy being dredged.

## 4.2 AIR QUALITY

Sections 109 and 301(a) of the Clean Air Act as amended in 1990 [42 U. S. C. 7409(a)], and Environmental Protection Agency (EPA) implementing regulations (40 CFR Part 50) define national, primary, and secondary ambient air quality standards as judged necessary to protect public health and welfare for "criteria" pollutants. EPA regulations establish National Ambient Air Quality Standards (NAAQS). The agency publishes a list of all geographic areas in relation to their compliance with NAAQS. Areas where NAAQS are being achieved are designated as "attainment" areas and are subject to Prevention of Significant Deterioration (PSD) regulations. Areas not in compliance are designated as "nonattainment" areas. The proposed project is in a nonattainment area for ozone, and therefore, is not subject to PSD regulations for ozone.

## 4.3 WATER QUALITY

Water Quality conditions in the Chesapeake Bay Area vary due to many factors (proximity to urban areas, type and extent of industrial activity, stream flow characteristics, amount and type of upstream land, and water usage). The water quality in the project area is considered good. The project area lies within the turbidity maximum of the Upper Bay, and suspended sediment levels may reach 150 mg/liter.

#### **4.3.1 Tidal Data, Currents, and Salinity**

The tide range is approximately 1 foot in the project area. In the larger Chesapeake Bay area, the mean range of tide is 2.8 feet at the Cape Henry Channel, 2.3 feet at the York Spit Channel, 1.4 feet at the Rappahannock Shoal Channel, 0.8 feet at the Craighill Entrance, 0.9 feet in the Craighill Upper Range, 1.1 feet at Fort McHenry, and 1.2 feet at Pooles Island in the upper Chesapeake Bay. Prolonged high winds from the north tend to blow water out of the Bay, resulting in unusually low tides, and prolonged high winds from the south tend to force water into the Bay, resulting in unusually high tides.

The velocity of the flood current varies in strength from about 1.0 knot at the entrance to the Chesapeake Bay to about 0.6 knot at the Craighill Entrance Channel. A vessel entering the Chesapeake Bay through the Virginia Capes at a speed of 12 knots can pass Cape Henry 2 or 3 hours prior to high tide and carry a favorable current all the way to Baltimore. A vessel leaving Baltimore at the same speed at high tide can carry a favorable current about two-thirds of the way to Cape Henry.

Currents affecting the study area are generally caused by tidal currents, fresh water runoff, and storm-induced surges. Since the Brewerton Channel Eastern Extension crosses the upper Chesapeake Bay, it is exposed to tidal currents and winds. Tidal currents are semidiurnal (generally two flood tides and two ebb tides per day), with predicted tidal currents aligned almost perpendicular to the channel, reversing approximately 180 degrees during flood and ebb tide cycles. Tidal currents have average maximum velocities of 0.2 and 0.4 knots for ebb and flood currents, respectively, at the western end of the channel, and 0.7 and 0.6 knots for ebb and flood currents respectively, at the eastern end of the channel. However, actual current velocities can frequently exceed 1 knot. Storm-induced surges and heavy runoff during and following storm events will increase current velocities throughout the area.

The salinity of the Chesapeake Bay ranges from highest at the mouth of Chesapeake Bay, where seawater enters the estuary through the Virginia Capes, to brackish water along the Susquehanna flats in the Upper Bay. Salinity varies considerably throughout the Bay along longitudinal and depth gradients, as well as seasonally. The salinity of the Bay is significantly affected by periods of drought and heavy rains, and by unseasonably warmer temperatures. At Baltimore, the salinity varies from an average of 8 parts per thousand (ppt) in the spring to 12 ppt in the fall. The salinity at the mouth of the Potomac River varies from 11 to 18 ppt, while at Cape Henry it varies from 23 to 29 ppt.

#### **4.4 AQUATIC RESOURCES - BREWERTON CHANNEL EASTERN EXTENSION**

A variety of recreationally and commercially important fishes occur in the area. These include striped bass, white perch, bluefish, channel catfish, American eel, spot, croaker, American shad, alewife, and blueback herring. The area is not an important spawning area, although larvae of such species as bay anchovy, Atlantic silverside, and others may be present in the water column. Blue crabs are fairly common. Two charted oyster bars, NOB 2-8 and NOB 2-9, are located within one-half mile of the channel.

#### **4.5 VEGETATION - BREWERTON CHANNEL EASTERN EXTENSION**

There are no SAV or wetlands within or adjacent to the channel.

#### **4.6 WILDLIFE RESOURCES - BREWERTON CHANNEL EASTERN EXTENSION**

The United States Fish and Wildlife Service (USFWS) reports the existence of two waterbird nesting colonies near the harbor. An established colony of black-crowned night herons (*Nycticorax nycticorax*), consisting of approximately 350 breeding pairs, nest at Sollers Point near the northern end of the Francis Scott Key Bridge. This is approximately 8 miles from the proposed dredging site and 8 miles from the HMI placement site. Approximately 500 pairs of herring gulls nest at a site on Sparrows Point. A variety of waterfowl species winter in the harbor area. These include mallards, scaup, bufflehead, goldeneye, ruddy duck, canvasback, Canada geese, and black duck.

#### **4.7 RARE, THREATENED, AND ENDANGERED SPECIES**

The USFWS has indicated that, except for occasional transient individuals, there are no federally listed endangered species in the Brewerton Channel Eastern Extension and Hart-Miller Island area. Peregrine falcons have been consistently observed nesting in downtown Baltimore at the Inner Harbor. A pair of falcons nests less successfully on the Key Bridge. Their diet generally consists of pigeons, but they occasionally will prey on various waterbirds. A bald eagle nest site is located in the vicinity of Black Marsh near the mouth of Back River. Black Marsh is approximately 3-4 miles from the project area. Bald eagles feed primarily on fish; however, neither species is expected to be affected by the proposed project. The State of Maryland has indicated that there are no state listed species of concern in the project area.

#### **4.8 FLOOD PLAINS**

The proposed placement area is located in the 100-year flood plain. Pursuant to Executive Order 11988 (Flood Plain Management), this area has been determined to be the most practicable alternative at this time; and the natural and beneficial values of the flood plain are expected to be minimal.

#### **4.9 WILD AND SCENIC RIVERS**

No national or state-designated wild and scenic rivers or river segments are located within the project area.

#### **4.10 CULTURAL RESOURCES**

The Baltimore District prepared an archeological report dated September 30, 1979. This report and intensive marine surveys have indicated that there are no historically significant artifacts in the proposed work areas. A review of the National Register Of Historic Places indicates that there are no registered properties or properties listed as eligible for inclusion therein located at the proposed work sites. The Maryland Historical Trust has indicated by letter dated June 27, 1996 that the proposed dredging represents no significant threat to submerged cultural resources, and additional archaeological investigations are not required.

#### **4.11 HAZARDOUS, TOXIC, AND RADIOACTIVE SUBSTANCES - (HTRS) HMI and Brewerton Extension**

Corps regulations require documentation of the existence of Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and National Priority List (NPL) sites within the boundaries of a proposed project that could impact, or be impacted by, the presence of Hazardous Toxic Radioactive Substances (HTRS) contamination. USACE regulation ER 1165-2-132 provides that dredged material and sediments beneath navigable waters proposed for dredging qualify as HTRS only if they are within the boundaries of a site designated by the EPA or a state for a response action, such as removal or remediation under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). Information about potential HTRS contamination was collected from several sources. These sources include a search of Federal and state environmental databases for CERCLA and RCRA sites. The results of these investigations for Brewerton Channel Eastern Extension and HMI indicate that there are no RCRA or CERCLA sites in the Brewerton Channel Eastern Extension or HMI area.

#### **4.12 INFRASTRUCTURE.**

The study area is centered in one of the nation's most comprehensive transportation networks along the Eastern seaboard. Three major airports serve the region, offering a variety of commuter, national, and international flights. Major rail service is provided primarily by CSX Transportation, Conrail, and Amtrak, while commuter service to and from Washington is provided by the State of Maryland through its commuter rail service (MARC). Light rail systems in the study area together with two major and modern subway systems provide efficient and convenient means of commuter transport. The study area includes a safe, efficient, and extensive network of interstate roads and highways including I-66, I-97, I-95, I-81, I-83, I-70, I-270, the Washington Beltway (I-495), and the Baltimore Beltway (I-695). These highway systems are used extensively by approximately 5,000 private truck haulers and independent common and contract haulers within the study area. The Port of Baltimore has container-handling and auto-handling facilities as well as facilities for loading and unloading a full range of bulk and general commodities.

#### **4.13 SOCIOECONOMIC CONDITIONS**

Since its founding in 1706, the Port of Baltimore has been a major impetus of growth and economic development. This influence has been, and continues to be, manifested not only at a local and regional level but at the national level as well. The port of Baltimore's influence extends beyond the boundaries of the State of Maryland to the Midwest, north into the Canadian provinces, and beyond the Atlantic Coast to the port's European and Asian trading partners. The port is located in the center of the Boston-Atlanta Corridor on the Atlantic Seaboard. Maryland is the 19th most populous state in the nation and exhibits a per capita income that is the 5th highest in the nation. More than 80 percent of Maryland's 5.0 million residents live in the Baltimore-Washington corridor (1995 estimate).

##### **4.13.1 Demographics**

In 1993, the Office of Management and Budget (OMB) designated the Washington and Baltimore Metropolitan Areas as the country's fourth largest Consolidated Metropolitan Statistical Area (CMSA), ranking behind only the New York-New Jersey CMSA; the Los Angeles-Riverside-Orange County CMSA; and the Chicago-Gary-Kenosha CMSA. Population statistics from the 1990 census indicate that the Washington-Baltimore CMSA had a total population of 6,727,050. The Washington, D.C., Primary Metropolitan Statistical Area (PMSA) registered a 1990 population of 4,223,485, while the Baltimore, Maryland, PMSA registered a 1990 total population of 2,382,172. Based on 1992 estimates, the Washington, D.C., CMSA population has grown to a total of 6,919,572, which represents a 2.9 percent growth from the 1990 totals.

The several jurisdictions of Baltimore City, Baltimore County, and Anne Arundel County immediately adjacent to the port, however, will likely experience more positive economic direct impacts than the suburban jurisdictions of Washington, D.C. Baltimore City registered a 1990 population of 736,014; its 1994 estimated population is 703,057. Baltimore County's 1990 recorded population was 692,134; its estimated 1994 population has increased to 711,783. Anne Arundel County also recorded population growth over this time period with its 1990 total population of 427,239 increasing to a 1994 estimated population of 456,171.

##### **4.13.2 Employment/Industry**

Employment in the study area in 1990 was 3,581,926, based on the results of the 1990 census. This employment was based on a civilian labor force total of 3,736,265 and does not include individuals employed by the Armed Forces. Given the 1990 unemployment figure of 154,339, the Washington-Baltimore CMSA study has exhibited a relatively low unemployment rate of 4.1 percent. Unemployment in the study area has historically been below the national average, due largely to the presence of the Federal government in the region and to the diversity of the region's economy.

One of the largest employers and revenue producers in the region is the Port of Baltimore. A recent analysis of job creation by the port indicates that nearly 87,000 jobs are directly or indirectly tied to commodity movement and vessel activity in the port. Slightly more than 50 percent of these jobs are held by Maryland residents and more than 18,000 are jobs directly

generated by (and wholly dependent upon) activities at the Port of Baltimore. Revenue generated by the movement of cargo and vessels through the port is estimated to have been \$1.305 billion in 1992. This estimate is based on revenues accruing to various sectors including maritime services, surface transportation, State and Federal governments, and financial and legal services.

#### **4.13.3 Schools, Libraries**

Over 1.5 million students attend the region's public and private elementary and secondary schools. As one of the United States' leading academic centers, the Washington-Baltimore CMSA is home to over 60 colleges and universities and to more than 250 trade and technical schools, each capable of meeting the educational and research needs of employers in the region including growth, service, and technical companies.

More than 80 percent of the adult population in the Washington-Baltimore CMSA are high school graduates. Nearly 32 percent of the adult population hold college degrees, which is the highest percentage in the country and nearly twice the national average. Moreover, 5 of the 10 counties in the United States with the highest educational achievement are located in the CMSA.

#### **4.13.4 Noise**

The noise in the Brewerton Channel Eastern Extension is predominantly generated by ships, tugs, and other vessels using the channel and is considered minor.

#### **4.13.5 Aesthetic Resources - Brewerton Channel Eastern Extension**

The visual experience in the project area is a combination of the activities of a typical commercial/industrial port and the natural beauty of the Chesapeake Bay. Many container vessels, tankers, bulk carriers, general cargo vessels and many smaller commercial and recreational vessels move around the harbor and channels areas.

#### **4.13.6 Recreation Resources - Brewerton Channel Eastern Extension**

The recreational setting in the Brewerton extension is generally limited to boating-related activities. Recreational fishing activity occurs primarily in the outer regions of the Harbor and in the Chesapeake Bay. Sport fish frequently sought include white perch, channel catfish, striped bass, bluefish, and blue crab. Conflicts with commercial navigation are rare.

### **4.14 ENVIRONMENTAL JUSTICE**

No low income or minority populations are located in the immediate vicinity of the proposed project.

#### **4.15 MOST PROBABLE FUTURE WITHOUT-PROJECT CONDITIONS**

The without-project condition is defined as the most likely condition expected to prevail over the length of the planning period (in this case, 50 years) in the absence of the Federal government implementing a plan of improvement. The without-project condition provides the baseline condition for estimating the benefits of improvements, the dollar costs of implementing improvements, and other impacts associated with any improvements.

The Port of Baltimore will continue to function as one of America's busiest deep-water ports. Its waterside and landside infrastructure will continue to accommodate a diverse mix of commodities and vessel types throughout the study planning period. The efficiencies of reduced shipping transit time would not be realized.

##### **4.15.1 Water Quality**

Water quality in the Chesapeake Bay and Baltimore Harbor has shown trends of improvement in recent years due to increased treatment of industrial and domestic pollution sources. There is strong potential for further improvements that should enhance the presence of fish and crabs in the study area. Recovery of the benthic community in parts of Baltimore Harbor is more difficult because of the persistence of contaminants in the bottom sediments and high turbidity.

##### **4.15.2 Sediment Quality**

All sediments deposited in the Brewerton Channel Eastern Extension by the shoaling process can be assumed to be very soft, highly plastic, silty clays. Sediments deposited in the Brewerton Channel Eastern Extension by the shoaling process of several millimeters per year would be clean since the channel is removed from known point-source discharges.

#### **5.0 ENVIRONMENTAL CONSEQUENCES**

##### **5.1 PROJECT AREA**

The proposed action will not change land use at the placement site, nor significantly change the use of the channel by humans or aquatic organisms.

##### **5.2 AIR QUALITY**

As stated in 40 CFR 93.153(c)(1), the proposed actions are exempt from the Clean Air Act Conformity Requirements (58 Fed. Reg. 63214, 30 Nov. 1993). The project will result in a temporary increase in emissions from construction vehicles (mobile sources). Emissions produced by the project are not expected to exceed ambient air quality standards. Temporary construction activities are generally accounted for in the Maryland State Implementation Plan. Coordination with the MDE has indicated that emissions produced by

the proposed project would be low enough that a conformity determination with the State Implementation Plan (SIP) will not be needed.

### **5.3 WATER QUALITY**

The discharge of return water from the placement site may result in temporary turbidity. Appropriate measures to minimize turbidity will be implemented. Erosion and sediment control measures will also be implemented in accordance with local, state, and Federal regulations. Turbidity associated with dredging and placement is expected to be temporary and minor. No significant contamination from dredging and placement is expected. No significant impacts to water quality are expected. A Clean Water Act Section 404(b)(1) evaluation was performed as included in Appendix IV.

### **5.4 AQUATIC RESOURCES AND WETLANDS**

No significant impacts to aquatic resources are expected as a result of the proposed action. Benthos within the area to be dredged is expected to be destroyed, but recolonization is expected within 1 to 2 years.

### **5.5 VEGETATION**

The proposed action will not result in significant impacts to vegetation since the placement site is currently a diked disposal area and does not contain mature or native vegetation. The USACE permit requires that "The State of Maryland in consultation with local and Federal agencies shall develop and implement a comprehensive plan for open space, fishing, wildlife and recreational use of Hart Miller Islands, and land created from the deposit of spoil within the containment area and ...as part of the open space concept, productive marshes shall be included within the project area". This activity has been begun for the South Cell and will be performed for the North Cell when it is fully utilized.

### **5.6 WILDLIFE RESOURCES**

Wintering waterfowl in the channel may be temporarily displaced while dredging occurs and the barges transit to and from the placement area. This disturbance is expected to be insignificant and waterfowl are expected to return after the barges pass. A positive impact is expected when birds are attracted to the ponds created at the placement site during material placement. Any adverse impacts to wildlife resources in the dredging and placement area will be temporary and insignificant and no significant changes to wildlife habitat will occur.

### **5.7 RARE, THREATENED, AND ENDANGERED SPECIES**

Coordination the USFWS and the State of Maryland has indicated that the proposed action will not adversely impact any Rare, Threatened, or Endangered species.

### **5.8 PRIME AND UNIQUE FARMLANDS**

There are no prime or unique farmlands in the project area.

### **5.9 WILD AND SCENIC RIVERS**

No wild or scenic rivers exist in the project area.

### **5.10 CULTURAL RESOURCES**

The Maryland Historical Trust has indicated that the proposed project will have an insignificant threat to aquatic cultural resources. Previous investigations have determined that there will be no impacts to terrestrial cultural resources.

### **5.11 HAZARDOUS, TOXIC, AND RADIOACTIVE SUBSTANCES**

The proposed project is not expected to result in the use or production of hazardous materials. No HTRS sites are within the vicinity of the proposed project.

### **5.12 INFRASTRUCTURE**

The proposed project will require the use of clamshell and scow, hydraulic pipeline or hopper dredges that will use the shipping channels. It will also require the use of vehicles and equipment to place the material. Project activities will be short-term and are not expected to significantly impact existing transportation routes such as shipping channels.

The proposed widening will be accomplished in a manner which minimized any impact on vessel traffic. The District works closely with the MPA, Association of Maryland Pilots (AMP), U.S. Coast Guard (USCG), and dredging contractors to minimize disruption of ship traffic during dredging projects. The MPA, AMP, and the USCG are consulted prior to preparation of the plans and specifications to include necessary conditions for performing the work. All contract specifications for dredging contractors to minimize obstructions to navigation and to move their equipment to provide safe passage of vessels.

Since the channel will be widened, the contractor will likely position his dredging equipment outside of the existing channel, over the area to be widened, so as not to obstruct the channel. Also, since the channel would be widened symmetrically about the existing centerline

and the channel is well marked with floating aids to navigation, no changes to the existing range lights will be required.

### **5.13 SOCIOECONOMIC CONDITIONS**

The project will improve access to Baltimore Harbor and provide safer and more economic shipping.

### **5.14 ENVIRONMENTAL JUSTICE**

Since no minority or low-income communities are located in the project area, this project is not expected to adversely impact these communities in accordance with Executive Order 12898, dated February 11, 1994 (*Environmental Justice in Minority and Low-Income Populations*).

### **5.15 IRRETRIEVABLE COMMITMENT OF RESOURCES**

The use of HMI as a dredged material placement site for the Brewerton Channel Eastern Extension is an irretreivable commitment of resources because there are a limited number of sites that are authorized to accept contaminated material. The impact of the use of this capacity is not expected to be significant.

### **5.16 CUMULATIVE IMPACTS**

The proposed project is not expected to contribute significant adverse cumulative impacts in the area. It will improve navigational access and result in beneficial impacts to the local and regional economy.

No adverse cumulative impacts are expected to result from turbidity and destruction of existing benthos caused by this project and other dredging projects in the area. No cumulative effects on natural resources are expected. The increase in shoaling over the existing channel is expected to be approximately 69,300 cy per year. Maintenance dredging would be expected to occur every other year if adequate funding is available. This amount is not considered large enough to cause any significant adverse cumulative impacts.

No significant adverse impacts to existing infrastructure are expected. However, the use of HMI will reduce the availability of that site for use in other dredging projects and since contaminated material from Baltimore Harbor can be legally placed in HMI, this type of placement capacity will be lost. The use of HMI for dredging the Brewerton Channel Eastern Extension, and other projects, could result in the conversion of open water or upland areas into dredged material placement sites. Some of these sites could be valuable environmental restoration projects while others could involve the conversion of valuable areas into placement sites that have lower values for natural resources. The construction and use of new placement sites requires the preparation of appropriate environmental documentation to evaluate potential impacts.

The above cumulative impacts are not considered significant because of the future site capacity expected at HMI, and at other sites that are being considered in plans by the State of Maryland and the Baltimore District.

## **5.17 ENVIRONMENTAL PERMITS AND REGULATORY COMPLIANCE**

In accordance with Section 404 of the Clean Water Act, an evaluation was conducted to assess impacts of the proposed actions to waters of the United States (Appendix IV). The State of Maryland has indicated that a water quality certificate will be issued and that the project will be in compliance with the Coastal Zone Management Act. A summary of compliance of the project with applicable environmental statutes is given in Appendix V.

## **6.0 COORDINATION**

The proposed project has been coordinated with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, Maryland Departments of Natural Resources, Maryland Department of Transportation, Maryland Department of the Environment, Maryland Port Administration, Maryland Housing and Community Development, Maryland Economic and Employment Development, and Maryland Historical Trust. A Public Notice dated May 30, 1996, was distributed to interested persons and organizations. Copies of environmental coordination correspondence and the public notice are included in Appendix I. Concerns expressed by agencies are summarized below:

### *Environmental Protection Agency (EPA)*

#### **Comment**

EPA expressed concern about the amount of material to be placed in HMI. The agency stated that the facility is very near capacity, and the remaining space should be reserved for contaminated material. EPA also indicated that material from "Brewerton Channel" should be placed in HMI because "historically these areas have sediments with various contaminants that would make the material unsuitable for beneficial use purposes or overboard disposal."

#### **Response**

The District concurs that sediments from the Brewerton Channel which is in close proximity to Baltimore Harbor may have contaminants that would be unsuitable for beneficial use or overboard disposal. However, sediments from the Brewerton Channel Eastern Extension which is not near Baltimore Harbor do not carry contaminant loadings that would restrict the use of these sediments for overboard placement or beneficial use.

At the time of the Public Notice for the Brewerton Channel Eastern Extension project, the MPA had not received the necessary permits to raise the dikes at HMI to 44 feet, adding to site capacity. The site is now expected to have sufficient capacity for the proposed dredging

of Brewerton Extension and other dredging. An analysis of sediments from Brewerton Channel Eastern Extension indicates that the material need not be placed in a site for contaminated material and is considered safe for open water placement. It is unclear whether EPA's comments were appropriate for the "Brewerton Channel" or the "Brewerton Channel Eastern Extension" since EPA has previously concurred with open water placement of sediments dredged from the Brewerton Channel Eastern Extension. HMI has been selected by the local sponsor because it is the only site that will be available. The difficulty in using the Brewerton material for beneficial use is not contamination but the material's fine-grained characteristic of over 50 percent clay and less than 10 percent sand, which limits its structural usage.

*National Marine Fisheries Service (NMFS)*

Comment

NMFS has stated that it has no objection to the proposed alignment changes but is concerned because HMI is designated as the placement site. NMFS's concern is that "the loss of HMI capacity means that a substitute containment facility must be quickly identified and constructed, and it is likely that additional aquatic habitat will be displaced as a result of the new material." NMFS has indicated that the material in the Brewerton Channel Extension is likely to be clean, will contain a high fraction of coarse-grained material, and will be suitable for a variety of alternatives within the aquatic environment.

Response

The District shares NMFS's concern regarding the efficient use of HMI as a containment facility. However, at this time, HMI is the only site that MPA has available for this material and the MPA has since started raising the HMI north cell dikes to provide an additional 30 mcu capacity. The District concurs that the material from Brewerton Channel Eastern Extension is uncontaminated enough for beneficial use. However, its small grain size restricts the type of application to non-structural uses. (See EPA comment above)

Comment

The Brewerton Channel Eastern Extension project is a channel improvement as opposed to maintenance activities necessary for maintaining channel use. Construction could be postponed until an appropriate fish enhancement or other in-water use has been identified and is ready for implementation.

Response

The District does not concur that deepening and widening of the Brewerton Channel Eastern Extension could be delayed until suitable beneficial opportunities are available. The proposed dredging is necessary to support shipping activities at the Port of Baltimore and to maintain the port's competitiveness. The providing of placement sites is the responsibility of the local sponsor, and HMI is the only site presently feasible, although the Pooles Island and Poplar Island sites are considered environmentally acceptable by the Baltimore District. The MPA

and the Corps of Engineers are developing placement plans to provide a combination of beneficial use of dredged material and less costly alternatives. If MPA proposes to use the Kent Island Deep Site 104 open water placement, and if environmental and economic evaluations support its use, the District will consider this site for the Brewerton Channel Eastern Extension.

*U.S. Fish and Wildlife Service (USFWS)*

Comment

The USFWS has no objections to this project in view of the relatively few adverse biological impacts associated with this project. However, USFWS states that "Disposal of the dredged material will reduce the limited remaining confined disposal capacity which exists in this region, and thereby accelerate the need to develop new disposal sites."

Response

The District concurs that the project will have few adverse environmental impacts and shares USFWS concern regarding the scarcity and the availability of placement sites. At present, there is more material that requires dredging than available placement site capacity, leaving a placement shortfall. This is especially important since HMI is available to accept contaminated material, and such sites are costly to construct and difficult to site. The MPA has since received approval to raise the HMI north cell dikes to provide an additional 30 mc capacity.

*Maryland Department of the Environment (MDE)*

Comment

MDE has a concern about the availability of HMI and whether the dikes will be raised in time to accept material from Brewerton Channel Eastern Extension. MDE requests that the District coordinate with MPA and MES to maximize the capacity of available placement sites.

Response

The District has been informed by MPA that HMI will be available to accept material from the proposed widening of the Brewerton Channel Eastern Extension. The District will continue its coordination with MPA, MES, and other agencies to ensure efficient utilization of placement areas.

## 7.0 CONCLUSIONS

This environmental assessment has evaluated the placement of dredged material from Brewerton Channel Eastern Extension and the placement of dredged material at the HMI Placement site, which is the site designated by MPA for material from the proposed project.

Also evaluated was the potential of using other placement sites. None of the existing sites except for HMI are presently planned for this project. Poplar Island and Pooles Island are the most likely alternative sites that could be used. EIS's have been prepared by the Corps of Engineers for these sites and they are considered environmentally acceptable although not feasible at this time. Upon completion of environmental studies on Site 104 near Kent Island, the Baltimore District will determine whether this site is an environmentally acceptable and cost-effective location for placement of material from Brewerton Channel Eastern Extension.

**EA APPENDIX I**  
**Environmental Coordination**



May 30, 1996

Operations Division

SUBJECT: Proposed New Work Dredging Baltimore Harbor and Channels, Maryland -  
42-Foot Project - Brewerton Channel Eastern Extension

PUBLIC NOTICE - B-96-2

TO WHOM IT MAY CONCERN:

Pursuant to Sections 313 and 404 of the Clean Water Act of 1977 (33 USC 1323 and 1344), NOTICE IS HEREBY GIVEN THAT PENDING HEADQUARTERS, U.S. ARMY CORPS OF ENGINEERS APPROVAL AND THE AVAILABILITY OF FUNDS, the Baltimore District, U.S. Army Corps of Engineers, proposes to perform new work dredging of the Baltimore Harbor & Channels 42-Foot Federal navigation project.

The plans and location of the proposed work are shown on the enclosed map. The work consists of performing new work dredging to widen the Brewerton Channel Eastern Extension from 35 feet deep and 450 feet wide to the authorized project dimensions of 35 feet deep and 600 feet wide. The dredging will include two feet of advanced maintenance dredging and two feet of allowable overdepth dredging. Construction of the project to 35 feet deep and 600 feet wide was authorized by the River and Harbor Act of July 3, 1958.

Approximately 2,500,000 cubic yards of material consisting primarily of mud, silt, sand, shell and mixtures thereof would be dredged by clamshell and scow, hydraulic pipeline, and/or hopper dredge. The State of Maryland will provide the 1,140-acre Hart-Miller Island dredged material containment facility located in the upper Chesapeake Bay near the mouth of Back River in Baltimore County for the deposition of material from the proposed dredging. In order to maximize drying and consolidation of the material at Hart-Miller Island, dredging will be scheduled to take place between October and March.

The sediment to be dredged has been tested in accordance with criteria promulgated by the Environmental Protection Agency as published in Title 40 of the Code of Federal Regulations, Section 230, to insure the suitability of the sediment for depositions in the Hart-Miller Island Containment facility. Dredged material previously removed from this channel has been considered satisfactory for deposition at Hart-Miller Island by the Regional Administrator, Environmental Protection Agency. The State of Maryland has indicated that the placement area and the placement operations will be monitored before, during, and after the proposed work.

The proposed methods of dredging and placement of material are addressed in and consistent with the Final Environmental Impact Statement and accompanying Supplemental Information - Operation & Maintenance of Baltimore Harbor & Associated Channels, Maryland & Virginia filed with the Council on Environmental Quality on January 10, 1975 and January 9, 1976, respectively; the Final Environmental Impact Statement for the Hart-Miller Island Diked Disposal Area, filed with the Environmental Protection Agency in 1974; the Final Environmental Impact Statement - Proposed Plan for Completing the Navigation Improvements, Authorized by the 1958 River and Harbor Act for the Baltimore Harbor and Channels, Maryland and Virginia, filed with the Environmental Protection Agency on November 21, 1979; the Supplement to the General Design Memorandum and Supplemental Information Report for the Baltimore Harbor and Channels Maryland and Virginia 42-Foot Project, filed with the Office of Federal Activities on June 23, 1986.

A preliminary review of this work and previous evaluations of historical dredging and placement operations for the Baltimore Harbor project indicate that the proposed work will not adversely affect listed species or their critical habitat pursuant to Section 7 of the Endangered Species Act as amended. As the evaluation of this work continues, additional information may become available which could change this preliminary determination.

The proposed new work dredging will comply with and will be conducted in a manner consistent with the approved Maryland Coastal Zone Management Program. The proposed work is being coordinated with the U.S. Environmental Protection Agency; U.S. Department of Interior, Fish and Wildlife Service; U.S. Department of Commerce, National Marine Fisheries Service; and the Maryland Departments of the Environment; Natural Resources; Transportation, Maryland Port Administration; Housing and Community Development; and Economic and Employment Development.

Designation of the proposed placement site for the dredged material associated with this Federal project shall be made through the application of guidelines promulgated by the administrator, Environmental Protection Agency, in conjunction with the Secretary of the Army. If these guidelines alone prohibit the designation of the proposed placement site, any potential impairment to the maintenance of navigation including any economic impact on navigation and anchorage which would result from the failure to use this placement site will also be considered.

Previous cultural resources reconnaissance surveys and intensive marine surveys have indicated that there are no historically significant artifacts in the proposed work areas. A review of the latest published version of the National Register of Historic Places indicates that there are no registered properties or properties listed as eligible for inclusion therein located at the proposed work sites. Currently unknown archaeological, scientific, prehistoric, or historical data may be lost or destroyed by the proposed work.

The decision whether to accomplish the work proposed in this public notice will be based on an evaluation of the probable impact, including cumulative impacts, of the proposed work on the public interest. The decision will reflect the national concern for the protection and utilization of important resources. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered; among those are conservation, economics, aesthetics, energy needs, general environmental concerns, fish and wildlife values, wetlands, historic and cultural values, navigation, shoreline erosion and accretion, water quality, flood hazards, flood plain values, land use, recreation, safety, food production, and in general, the needs and the welfare of the people. The work will not be accomplished unless it is found to be in the public interest.

The proposed dredged material placement area is located in the 100-year flood plain. Pursuant to Executive Order 11988 (Flood Plain Management) this area has been determined to be the most practicable alternative at this time. The impacts of this action on flood hazard; human safety, health and welfare; and the natural and beneficial values of the flood plain are expected to be minimal.

Any person who has an interest which may be affected by the placement of this dredged material may request a public hearing. The request must be submitted in writing to the District Engineer, U.S. Army Corps of Engineers, Baltimore District, P.O. Box 1715, Baltimore, Maryland 21203-1715 within 30 days of the date of this notice and must clearly set forth the interest which

- 3 -

may be affected and the manner in which the interest may be affected by this activity.

Written comments regarding the proposed work and related factors described above must be received by the District Engineer, U.S. Army Corps of Engineers, Baltimore District, P.O. Box 1715, Baltimore, Maryland 21203-1715 within the comment period specified above to receive consideration. Please contact Mr. Jeffrey McKee at (410) 962-5657 if there are any questions regarding the proposed work.

A Water Quality Certification will be required from the Department of the Environment for this project. This certification is required under Section 401 of the Clean Water Act. Any written comments or questions regarding water quality considerations involved with this project should be directed to the Division of Standards and Certifications, Department of the Environment, 2500 Broening Highway, Baltimore, Maryland 21224, telephone (410) 631-3603.

Please communicate the foregoing information concerning the proposed work to any persons known by you to be interested, and who not being known to this office, do not receive a copy of this notice.

**Signed**

John P. O'Hagan, ~~P.E.~~  
Chief, Operations Division

Enclosure  
Map of Dredging Area and  
Dredged Material Placement Area

CF:  
CENAD-ET-O  
CENAB-PL  
CENAB-PA  
CENAB-OC

DEPARTMENT OF THE ARMY

May 31, 1996

Operations Division

Dr. Sarah Taylor-Rogers  
Assistant Secretary for Resource Management  
Maryland Department of Natural Resources  
Tawes State Office Building  
Annapolis, Maryland 21401

Dear Dr. Taylor-Rogers:

I am writing regarding the proposed widening of the Brewerton Channel Eastern Extension of the Baltimore Harbor & Channels 42-Foot Federal navigation project.

The River and Harbor Act of July 3, 1958, authorized the deepening and widening of the Brewerton Channel Eastern Extension from 27 feet deep and 400 feet wide, to 35 feet deep and 600 feet wide. The channel was constructed to 35 feet deep and 450 feet wide in 1986. The eastern end of the channel was widened from 450 feet to 600 feet for a length of approximately one nautical mile for navigation safety in 1991. The proposed work consists of widening the remaining five miles of channel from 35 feet deep and 450 feet wide to 35 feet deep and 600 feet wide to improve navigation safety. The dredging requires the removal of approximately 2,500,000 cubic yards of material and includes 2 feet of advanced maintenance dredging and 2 feet of allowable overdepth dredging. The State of Maryland has designated the Hart-Miller Island containment facility for the deposition of the dredged material. A map of the proposed dredging and placement areas is enclosed.

The sediments were analyzed to determine the chemical concentrations in accordance with the "Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. - Testing Manual" (draft), U.S. Environmental Protection Agency and the Department of the Army, U.S. Army Corps of Engineers, June 1994. The test results are included in the Draft Data Report - FY 1995 Sediment Sampling and Chemical Analysis for Baltimore Harbor and Chesapeake Bay, Maryland, February 1996 which was enclosed in my March 25, 1996, letter.

In accordance with the National Environmental Policy Act of 1969, we request that you submit baseline environmental information within your area of expertise in order to prepare the necessary environmental documentation for the proposed dredging.

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This work is being coordinated with the National Marine Fisheries Service, U.S. Fish & Wildlife Service, U.S. Environmental Protection Agency, Maryland Department of the Environment and the Maryland Historical Trust. Please provide your comments on the proposed dredging before July 5, 1996.

Please call me at (410) 962-5657 if you have any questions regarding this matter.

Sincerely,

**Signed**

  
Jeffrey A. McKee  
Project Manager  
Operations Division

Enclosure

Copy Furnished:

Mr. Ray Dintaman, Jr.  
Director, Environmental Review, B-3  
Resource Management Services  
Maryland Department of Natural Resources  
Tawes State Office Building  
Annapolis, Maryland 21401

Dr. Peter Dunbar  
Power Plant & Environmental Review Division  
Maryland Department of Natural Resources  
Tawes State Office Building  
580 Taylor Avenue  
Annapolis, Maryland 21401

Mr. Frank Hamons  
Manager, Harbor Development  
Maryland Port Administration  
The Maritime Center II  
2310 Broening Highway  
Baltimore, Maryland 21224-6621

-3-

Mr. James Peck  
Director  
Maryland Environmental Service  
2011 Commerce Park Drive  
Annapolis, Maryland 21401

Ms. Marni Dolinar  
Project Manager  
Hart-Miller Island  
Maryland Environmental Service  
2011 Commerce Park Drive  
Annapolis, Maryland 21401

CF:  
✓CENAB-PL





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III

841 Chestnut Building  
Philadelphia, Pennsylvania 19107-4431

JUN 28 1996

Mr. Jeffrey A. McKee  
Project Manager  
Operations Division  
Baltimore District, Corps of Engineers  
P.O. Box 1715  
Baltimore, Maryland 21203-1715

RE: The Baltimore Harbor & Channels 42-Foot Federal Navigation Project in the Tolchester and Brewerton Channels

Dear Mr. McKee:

EPA has reviewed your letters of May 31, 1996 and June 3, 1996, both requesting scoping comments for preparation of an Environmental Assessment (EA) to address the potential environmental effects from the proposed dredging in each of the projects referenced above. The proposed dredging of the Tolchester Channel would provide a new straight channel 35 feet deep and 600 feet wide, and it would require the removal of approximately 3,000,000 cubic yards of material. The proposed widening of a 5 mile segment of the Brewerton Channel would require the removal of approximately 2,500,000 cubic yards of material. The Hart-Miller Island containment facility has been designated for the deposition of the dredged material.

The purpose of the EA document is to provide a full and fair discussion of significant environmental impacts and to inform the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment. The document is a decision making tool for the determination of a preferred alternative and whether to proceed with the proposed project. The document should include:

Purpose and Need For Project

Describe the underlying need for the project in detail, including economic, technical, and other reasons for proposing this project.

Alternatives

The Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) Implementation regulations (40 CFR 1502.14 (b)) states that agencies shall devote

substantial treatment to each alternative considered in detail so that reviewers may evaluate their comparative merits. In the discussion of alternatives, explore and objectively analyze all reasonable alternatives meeting the need for the project. Include an explanation why any reasonable alternative was eliminated from detailed study. Present the alternatives in a form that allows easy comparison. Also, when evaluating each alternative, we recommend that the alternative site with the least environmental impacts be considered for implementation.

#### Environmental Impacts

In the EA, thoroughly describe all environments impacted by the proposed activity, including the project area and other areas that might be affected either directly or indirectly. Special attention should be paid to natural habitats such as forest and wetlands, parklands, recreational lands, and waterways. Discuss the socio-economic and cultural status of the area.

#### Threatened and Endangered Species

In the EA, identify any Federally or State listed threatened or endangered species inhabiting the study area. The potential impacts to these species should be thoroughly described in the Environmental Consequences section. If an endangered species will be impacted by the project, the U.S. Fish and Wildlife Service should be consulted.

#### Secondary and Cumulative Impacts

EPA suggests that secondary and cumulative impacts be addressed in the document. This section should cover anticipated growth as the result of the proposed action. The CEQ regulations require the evaluation of the indirect impacts of the proposed project and the significance of those impacts. Indirect impacts are defined by 40 CFR 1508.8 (b) as "those effects which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable." Indirect effects may include growth inducing effects related to changes in the patterns of land use, population density or growth rate, and related effects on air, water, increased traffic, or expanded utilities.

#### Dredging Impacts/Disposal Alternatives


EPA is concerned with the amount of material proposed to be placed in the Hart-Miller Island containment facility. As you know, Hart-Miller is very near to capacity and EPA believes that the remaining space should be reserved for contaminated dredged material that cannot be deposited elsewhere. EPA concurs with the need to place the material dredged from Brewerton Channel in Hart-Miller Island, as historically these areas have sediments with various contaminants that would make the material unsuitable for beneficial use purposes or overboard disposal. However, Tolchester Channel is far enough removed from known sources of contamination and with the appropriate verification, the material dredged from this area could be used for beneficial use purposes or deposited elsewhere. With the cost sharing provisions of the Water Resources Development Act (WDRA) of 1986 for beach nourishment

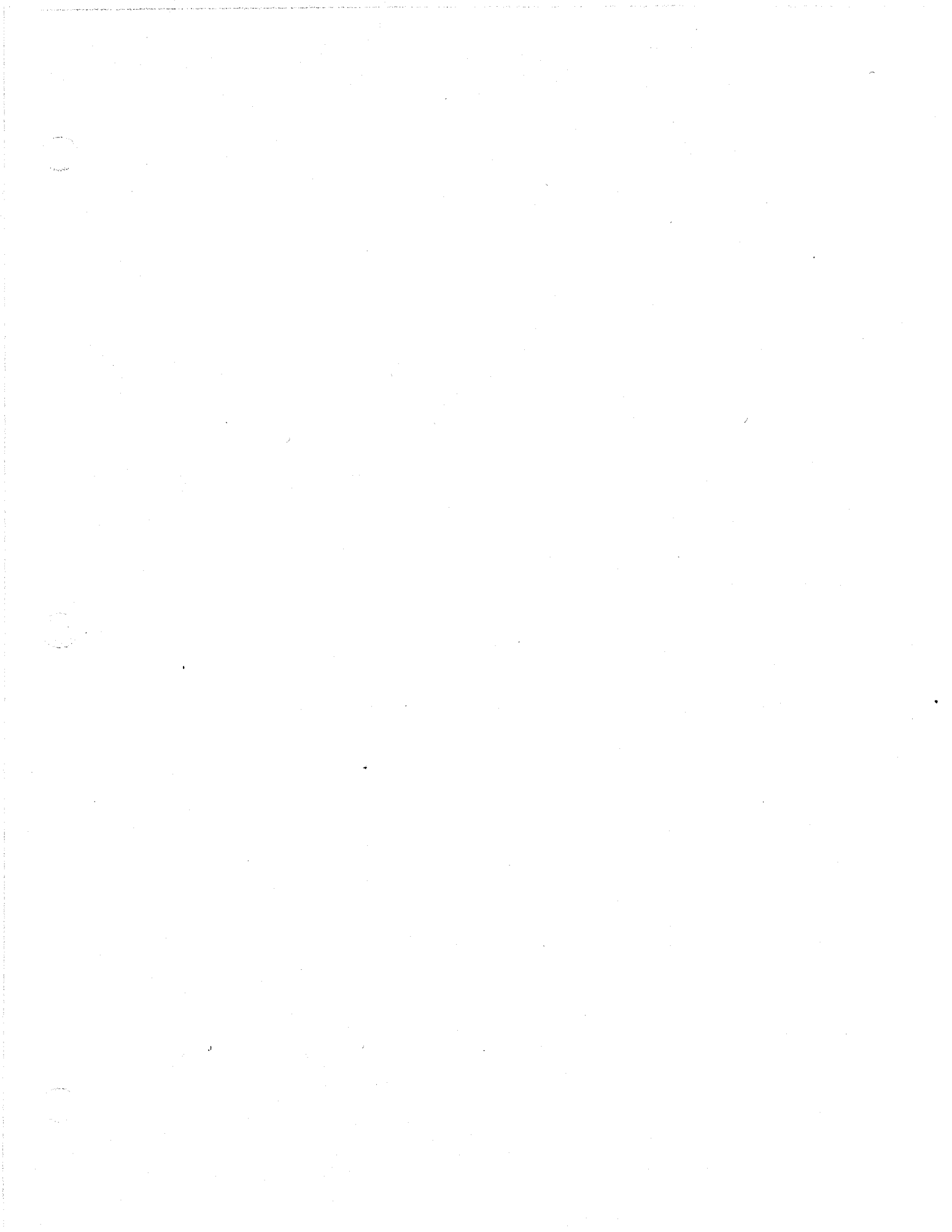
[§933] and environmental restoration [§904] and under §904 of WDRA 1992 for beneficial uses, it is even economically advantageous as well as environmentally suitable.

EPA encourages the COE to investigate the beneficial use potential for the material dredged from the Tolchester Channel. One possibility is the use of a portion of the material for the Poplar Island beneficial use project. EPA had the opportunity to comment on the Draft Environmental Assessment (EA) for Poplar Island Test Containment Dike Construction and saw that some of the material used for the test would be placed in a geotextile tube. While some of the material from the Tolchester Channel may be incompatible for sand dikes or beach nourishment purposes, the material could be used for filling the geotextile tube. Other possibilities include salt pond restoration and salt pond rehabilitation or other types of habitat creation. If the material is found to be unsuitable for these types of uses, EPA recommends that the material from Tolchester Channel be placed at the overboard disposal site at Poole's Island.

Thank you for the opportunity to participate in the early NEPA scoping phase of this project. If you have any questions please call me at (215) 566-2721 or have your staff contact Brigitte Farren at (215) 566-2767.

Sincerely,

  
John Forren  
NEPA Program Manager





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
NORTHEAST REGION  
One Blackburn Drive  
Gloucester, MA 01930

JUL 11 1996

Col. Randall R. Inouye  
District Engineer  
Baltimore District, Corps of Engineers  
P.O. Box 1715  
Baltimore, Maryland 21203

Dear Colonel Inouye:

This pertains to correspondences, dated May 31 and June 3, 1996, requesting our comments on the proposed widening of the Brewerton Channel Eastern Extension, and straightening of the Tolchester "S-Turn" Channel. Both proposals are associated with the Chesapeake and Delaware Canal approach channels for the Baltimore Harbor Federal Navigation Project. We have no objection to the proposed alignment changes to these channel segments. However, we are greatly concerned with the decision to place material resulting from these proposals within the Hart-Miller Island containment facility.

The Hart-Miller Island containment facility, originally designed for placement of contaminated spoil, has not been used prudently in the past, and has had much of its capacity lost to disposal of clean and/or coarser-grained material. The subsequent loss of this capacity has contributed to the current emergency circumstances that the Maryland Port Administration faces because of the rapidly increasing shortfall in spoil disposal capacity associated with the Baltimore Harbor project. The loss of Hart-Miller Island capacity means that a substitute containment facility must be quickly identified and constructed, and it is likely that additional aquatic habitat will be displaced as a result of the new facility.

Because both of the proposed channel realignments will cut into untouched or virgin sediments, it is highly likely that the resulting dredged material will be clean and will contain a high fraction of coarse-grained material. It is also probable that much of the material generated by these projects will be suitable for a variety of alternative uses within the aquatic environment. The decision to use the Hart-Miller Island without a detailed analysis of the sedimentary characteristics of the dredge areas, and without consideration of alternative uses for the subject material could result in unnecessary wastage of 5.5 million cubic yards of the remaining capacity of the containment facility.

The Phase II Bay Enhancement work group of the Baltimore Harbor Dredging Needs And Placement Options Program identified clean virgin dredge material as an important source of material for in-water uses, including fish habitat enhancement, such as oyster bar re-structuring and creation of topographically diverse bottom. It was further stipulated by the work group that projects involving dredging of new areas should be closely studied to determine the suitability of



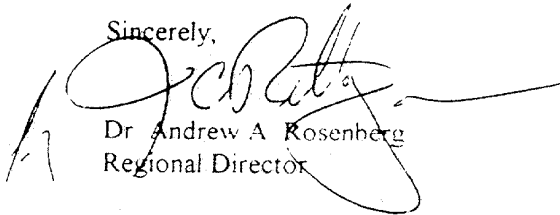
sedimentary material for fish habitat enhancement and other in-water uses. Additionally, it was recommended that suitable material be directed to in-water use to permit the conservation of existing containment facilities for placement of less suitable material.

The above policy should be applied to the Brewerton and Tolchester projects. We recommend that sub-sedimentary profiles of each proposed dredge area be studied to determine sediment characteristics and suitability for in-water use. Incorporation of current technology on sediment profile analysis developed by companies, such as Great Lakes Dredging, may facilitate a sub-sedimentary study of the dredge areas.

Difficulties are frequently encountered in timing and coordinating dredging and in-water use projects. However, both the Brewerton and Tolchester projects are channel improvements, as opposed to maintenance activities necessary for maintaining channel use. Consequently, immediate construction of either project is not mandatory. Alternatively, construction of these projects could be postponed until an appropriate fish enhancement or other in-water use has been identified and is ready for implementation.

If there are any questions concerning these comments, please do not hesitate to call our Oxford field office at (410) 226-5771.

Sincerely,



Dr. Andrew A. Rosenberg  
Regional Director



Parris N. Glendonin  
Governor

Patricia J. Payn  
Secretary, DHCI

June 27, 1996

Archaeology Office

Jeffrey A. McKee, Project Manager  
Operations Division  
Baltimore District, Corps of Engineers  
P.O. Box 1715  
Baltimore, Maryland 21203-1715

Mr. McKee:


This office has reviewed the following Corps permit. The project listed below has been found to represent an insufficient threat to submerged cultural resources to necessitate an archaeological investigation. Our office, therefore, has no objections to the issuance of the following permit:

Widening of the Brewerton Channel

We would request, however, that if archaeological material (i.e. ceramics, glass, metal, projectile points, pot sherds, and/or wood such as beams, frames, keels, planks, etc.) be uncovered in the course of these undertakings that this office be notified and our staff given an opportunity to visit the site to evaluate the material.

Thank you for your cooperation and assistance. If you have any questions or require further information, please contact Dr. Susan Langley at (410) 514-7662 or Mr. Bruce F. Thompson at (410) 514-7663.

Sincerely,

  
Stephen R. Bilicki  
Underwater Archeologist

SRB  
9602308

cc: Mr. Joseph McNamara  
Ms. Judith Kremen  
Mr. John W. McGrain



Division of Historical and Cultural Programs  
100 Community Place • Crownsville, Maryland 21032 • (410) 514-7661

The Maryland Department of Historical and Cultural Affairs, Division of Historical and Cultural Programs (DHCP) is an Equal Opportunity Office.





Parris N. Glendening  
*Governor*

**Maryland Department of Natural Resources**  
Fish, Heritage and Wildlife Administration  
Tawes State Office Building  
Annapolis, Maryland 21401

John R. Griffin  
*Secretary*

Ronald N. Young  
*Deputy Secretary*

July 18, 1996

District Engineer, US Army Corps  
of Engineers, Baltimore District  
attn: Mr. Jeffrey McKee  
PO Box 1715  
Baltimore MD 21203-1715

re: Proposed New Work Dredging Baltimore Harbor and Channels,  
Maryland - 42-foot Project, Brewerton Channel Eastern  
Extension.

Dear Mr. McKee:

The Wildlife and Heritage Division has no records for Federal or State rare, threatened or endangered plants or animals within the referenced project site. This statement should not be interpreted as meaning that no rare, threatened or endangered species are present. Such species could be present but have not been documented because an adequate survey has not been conducted or because survey results have not been reported to us.

In response to your conversation with Bill Harvey, Waterfowl Program Manager, please disregard the waterfowl comment as stated in our response letter dated June 26, 1996. Since Hart-Miller Island is designated a dredge disposal site, we are reissuing a statement of "No Concern" for this area.

Sincerely,

*Michael E. Slattery*

Michael E. Slattery  
Associate Director, Wildlife  
& Heritage Division

cc: Bill Harvey  
ER# 96.560.baco/revised



MARYLAND *Office of Planning*

Parris N. Glendening  
Governor

Ronald M. Kreüner  
Director

June 21, 1996

Mr. Jeffrey McKee  
Project Manager  
Baltimore District  
U.S. Army Corps of Engineers  
P.O. Box 1715  
Baltimore, MD 21203-1715

**STATE CLEARINGHOUSE REVIEW PROCESS**

Reply Due Date: July 22, 1996  
State Application Identifier: MD960617-0461  
Project Description: Dredging Baltimore Harbor and Channels: Widen the Brewerton Channel  
Eastern Extension  
State Clearinghouse Contact: Bob Rosenbush

Dear Mr. McKee:

This letter acknowledges receipt of the referenced project. We have initiated the Maryland Intergovernmental Review and Coordination Process (MIRC) as of the date of this letter. You can expect to receive review comments and recommendations on or before the reply date indicated. Please place the State Application Identifier Number on all documents and correspondence regarding this project.

This project has been sent to the following agencies or jurisdictions for comment: The Maryland Departments of Agriculture, Business and Economic Development, Environment, Housing and Community Development, including the Maryland Historical Trust, Natural Resources, Transportation; Baltimore City, Baltimore and Anne Arundel Counties; and the Maryland Office of Planning.

Your participation in the MIRC process helps to ensure that this project will be consistent with the plans, programs, and objectives of State agencies and local governments. Issues resolved through this process enhance the opportunities for project funding and minimize delays during project implementation.

If you need assistance or have questions concerning this review, please contact the staff person noted above. Thank you for your cooperation.

Sincerely,

William G. Carroll  
Manager, Plan and Project Review

WGC:BR:s





**MDE**

**MARYLAND DEPARTMENT OF THE ENVIRONMENT**

2500 Broening Highway • Baltimore, Maryland 21224  
(410) 631-3000

Parris N. Glendening  
Governor

Jane T. Nishida  
Secretary

**JUL 23 1996**

Mr. Jeffrey A. McKee  
Operations Division,  
Baltimore District, Corps of Engineers  
P.O. Box 1715  
Baltimore, MD 21203-1715

Dear Mr. McKee:

I am responding to your letters regarding the proposed straightening of the Tolchester Channel and the deepening and widening of the Brewerton Channel Eastern Extension of the Baltimore Harbor and Channels 42-Foot Federal navigation project. The realigned Tolchester Channel will be dredged to the authorized dimensions of 35-feet deep and 600 feet wide, and the Brewerton Channel will be deepened and widened to 35-feet deep and 600 feet wide.

The proposed Tolchest Channel realignment will require the removal of approximately 3.0 million cubic yards of material and the proposed Brewerton Channel Eastern Extension will require 2.5 million cubic yards of material to be moved. The dredged material will be placed at the Hart-Miller Island containment facility.

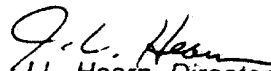
Our major concern regards the time frame for the proposed work. First, it is not clear whether the proposed work is to be accomplished during one dredging cycle or over a period of several cycles. At the present time, Hart-Miller Island does not have the capacity to handle the anticipated amount of dredged material. As you are aware, the State is proposing to raise the dikes at the containment facility. Although additional capacity may be available during the next dredging cycle, the entire dike building project will take several years. Second, this project should be coordinated (along with other cooperative projects) with the Maryland Port Administration and Maryland Environmental Service to maximize the capacity of the available disposal sites.

Mr. Jeffrey A. McKee

Page 2

Thank you for the opportunity to provide comments on the proposed channel deepening and widening. If you have any questions, please contact Elder Ghigiarelli, Jr., of my staff at (410) 974-2156, or Mr. Visty Dalal, Technical and Regulatory Services Administration, at (410) 631-3689.

Sincerely,

  
J.L. Hearn, Director

Water Management Administration

JLH:EAGJr:cma

cc: Pete Tinsley  
Elder Ghigiarelli, Jr.  
Visty Dalal



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office

177 Admiral Cochrane Drive

Annapolis, MD 21401

July 2, 1996

Colonel Randall R. Inouye  
District Engineer  
U.S. Army Corps of Engineers  
P.O. Box 1715  
Baltimore, MD 21203-1715

Attn: Jeffrey McKee

Re: Widening of the Brewerton  
Channel Eastern Extension

Dear Colonel Inouye:

This responds to Public Notice B-96-2, dated May 30, 1996, and Mr. McKee's letter dated May 31, 1996, requesting comments on the proposed widening of the Brewerton Channel Eastern Extension, Maryland. The proposed work involves dredging approximately 2,500,000 cubic yards of material to widen the channel from its current width of 450 feet to its authorized width of 600 feet. The dredged material would be deposited in the Hart-Miller Island disposal facility. The work is scheduled to take place between October and March. The following comments are submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*) and Section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

A variety of recreationally and commercially important fishes occur in the area. These include, for example, striped bass, white perch, bluefish, channel catfish, American eel, spot, croaker, American shad, alewife, and blueback herring. The area is not an important spawning area although the larvae of such species as bay anchovy, Atlantic silverside and others may occur in the water column. Blue crabs are fairly common. Two chartered oyster bars, NOB 2-8 and NOB 2-9, are located within one half mile of the channel.

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project impact area. Therefore, no Biological Assessment or further Section 7 Consultation pursuant to the Endangered Species Act of 1973 is required with the Fish and Wildlife Service. Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered.

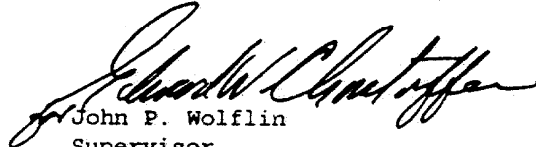
This channel undergoes regular dredging. Monitoring studies have shown that the dredging causes a short-term impact to water quality due to an increase in turbidity and slight decrease in dissolved oxygen in the vicinity of the dredge. The benthic invertebrate community is removed by dredging, but

typically recolonizes over the following year. The dredging has not been observed to result in significant impacts to fish or other aquatic resources in this area. The effects of the proposed widening should not be materially different than those documented during maintenance dredging operations.

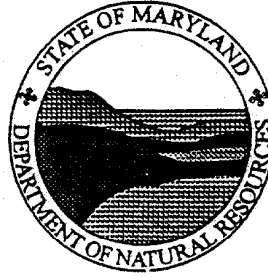
Besides the 2.5 million cubic yards of initial dredging, there will likely be an increased amount of maintenance dredging. Disposal of the dredged material will reduce the limited remaining confined disposal capacity which exists in this region, and thereby accelerate the need to develop new disposal sites.

In view of the relatively low adverse biological impacts associated with this project, the Service has no objection to the work. If there are any questions, please contact George Ruddy of my staff at (410) 573-4528.

Sincerely,



John P. Wolflin  
Supervisor  
Chesapeake Bay Field Office



Parris N. Glendening  
*Governor*

Maryland Department of Natural Resources  
Fish, Heritage and Wildlife Administration  
Tawes State Office Building  
Annapolis, Maryland 21401

John R. Griffin  
*Secretary*

Ronald N. Young  
*Deputy Secretary*

June 26, 1996

District Engineer, US Army Corps  
of Engineers, Baltimore District  
attn: Mr. Jeffrey McKee  
PO Box 1715  
Baltimore MD 21203-1715

re: Proposed New Work Dredging Baltimore Harbor and Channels,  
Maryland - 42-foot Project, Brewerton Channel Eastern  
Extension.

Dear Mr. McKee:

The Wildlife and Heritage Division has no records for Federal or State rare, threatened or endangered plants or animals within the referenced project site. This statement should not be interpreted as meaning that no rare, threatened or endangered species are present. Such species could be present but have not been documented because an adequate survey has not been conducted or because survey results have not been reported to us.

However, the open waters of the dredge disposal site are known historic waterfowl concentration areas. Dredging should not occur during the November 1 - April 30 wintering period. For technical assistance, please contact Mr. William Harvey, Waterfowl Program Manager, at 410-827-8612.

Sincerely,

*Michael E. Slattery*  
Michael E. Slattery *MSF for*  
Associate Director, Wildlife  
& Heritage

cc: Bill Harvey  
ER# 96.560.baco



Parris N. Glendening  
Governor

**Maryland Department of Natural Resources**  
Environmental Review  
Tawes State Office Building  
Annapolis, Maryland 21401

John R. Griffin  
Secretary  
Carolyn D. Davis  
Deputy Secretary

July 8, 1996

Mr. Jeffrey A. McKee  
Project Manager, Operations Division  
U.S. Army Corps of Engineers, Baltimore District  
P.O. Box 1715  
Baltimore, Maryland 21203-1715

RE: Proposed Widening of the Brewerton Channel Eastern Extension and Straightening of the Tolchester Channel in the Chesapeake Bay; Chesapeake Bay Area

Dear Mr. McKee:

The above referenced projects have been reviewed by the Department of Natural Resources for associated ecological impacts. In the first project, the U.S. Army Corps of Engineers proposes to widen the five miles of the Brewerton Channel Eastern Extension not widened in 1991 from the current width of 450 feet and 35 foot depth to a width of 600 feet and a 35 foot depth plus 2 feet of advance maintenance dredging and 2 feet of allowable overdepth dredging to improve navigational safety. A total of about 2.5 million cubic yards of material would be removed and deposited in the Hart-Miller Island Containment Facility. The second project proposed by the U.S. Army Corps of Engineers is the straightening of the Tolchester Channel Eastern to remove the "S-Turn" just south of Tolchester Marina near the northern end of the channel. The new channel would be dredged to the same width ( 600 feet) and depth ( 35 foot ) as the current Tolchester Channel plus 2 feet of advance maintenance dredging and 2 feet of allowable overdepth dredging to improve navigational safety. A total of about 3,000,000 cubic yards of material would be removed and deposited in the Hart-Miller Island Containment Facility.

The proposed areas of dredging activity are within excellent fishing areas heavily utilized by Chesapeake Bay sport fishermen during the Fall striped bass season. Past experience has demonstrated that the fishing grounds north of the Bay Bridges offer prime fishing in October with

Mr. Jeffrey A. McKee


July 8, 1996

Page 2

many boats and anglers participating in the fishery. To avoid potential conflicts with sportfishing activities, the Department of Natural Resources requests that the proposed dredging for both projects be conducted during the period November 1 through March 31. Delaying the start of dredging until November 1st would minimize dredging activity in areas of heaviest fishing pressure during October, and as the Fall fishing season progressed, the fish and fishermen would be tending to move down the Bay and away from the proposed dredging sites.

Should you require additional information on this project, please feel free to contact Roland Limpert of my staff at (410) 974-2788.

Sincerely,



Ray C. Dintaman, Jr., Director  
Environmental Review Unit

RCD:RJL

cc: P. Massicot, DNR-RAS  
D. Leonard, DNR-FS  
H. King, DNR-FS  
E. Ghigiarelli, MDE

CONVERSATION RECORD

TIME:            DATE: 3 Oct. 1996            FILE NAME: usr2/mendels

TYPE:

TELEPHONE:  
  incoming:  
  outgoing:X

VISIT:

CONFERENCE:

Name of person(s) contacted:

Organization:

Phone No.:

Ms. Dianne Franks

MDE Air Quality

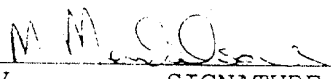
SUBJECT: Brewerton Channel Extension

SUMMARY:

I called Ms. Franks about conformity with the State Implementation Plan of the 1990 Clean Air Act ammendments. we talked about project activites and emmissions. She said that the project would be in conformity and a formal connformity determination would not be necessary for the project.

Mark Mendelsohn

NAME OF PERSON DOCUMENTING CONV.

  
SIGNATURE

10/03/96

DATE

ACTION TAKEN:

CONVERSATION RECORD

TIME: DATE: 23 Sept 1996 FILE NAME: usr2/mendels

TYPE:

TELEPHONE:  
incoming:  
outgoing: X

VISIT:

CONFERENCE:

Name of person(s) contacted:

Organization:

Phone No.:

Mr. Elder Ghiagerelli

MDE

(410) 974-2156

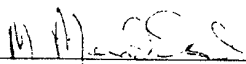
SUBJECT: Brewerton Channel Extension

SUMMARY:

I called Mr. Ghiagerelli about Coastal Zone Management (CZM) consistency for the project. He said the Corps will be receiving a letter from MDE acknowledging consistency and also a Water Quality Certificate from MDE.

Mark Mendelsohn

NAME OF PERSON DOCUMENTING CONV.

 SIGNATURE

9/23/96 DATE

ACTION TAKEN:

## EA APPENDIX II

### Figures

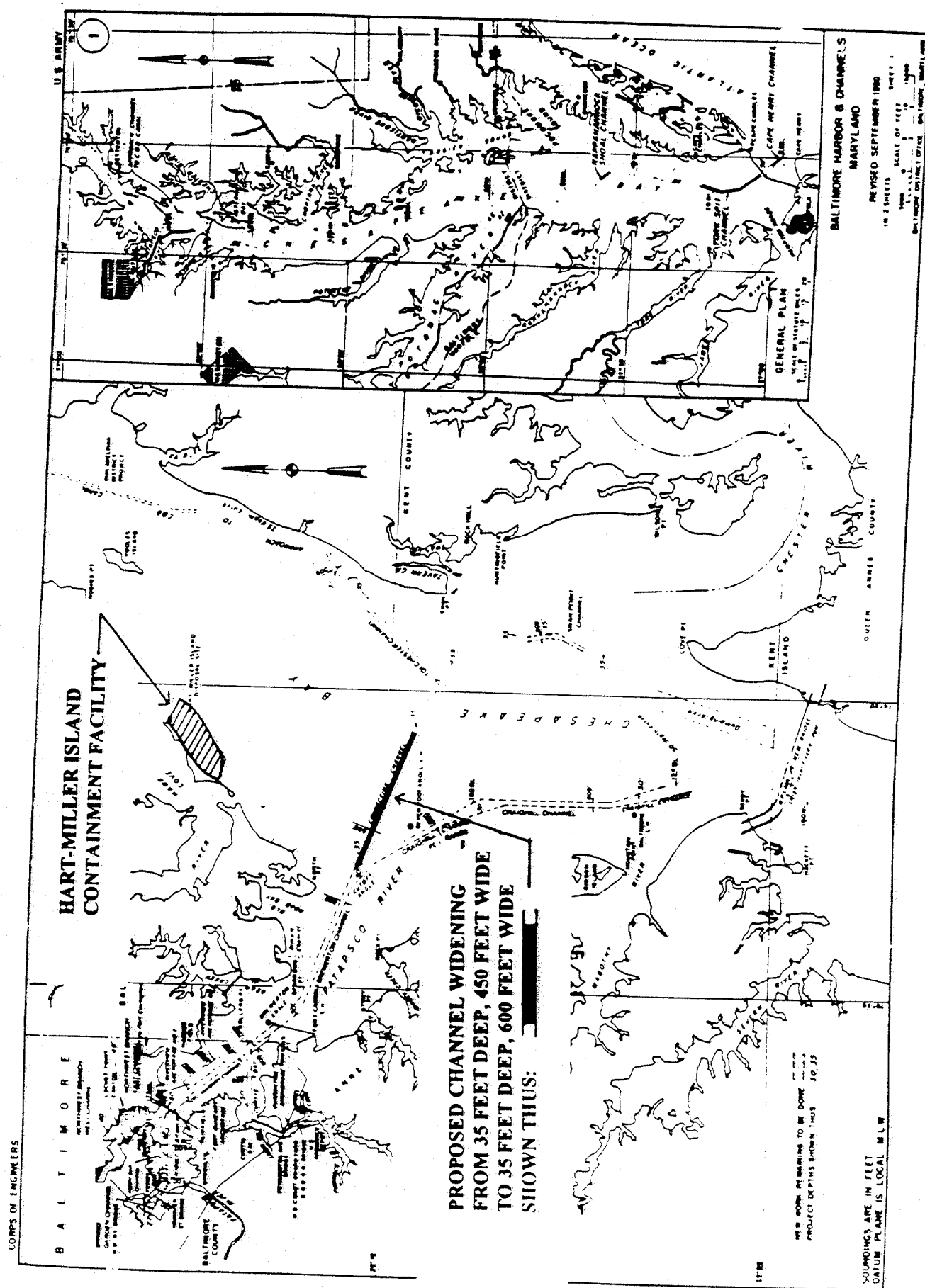
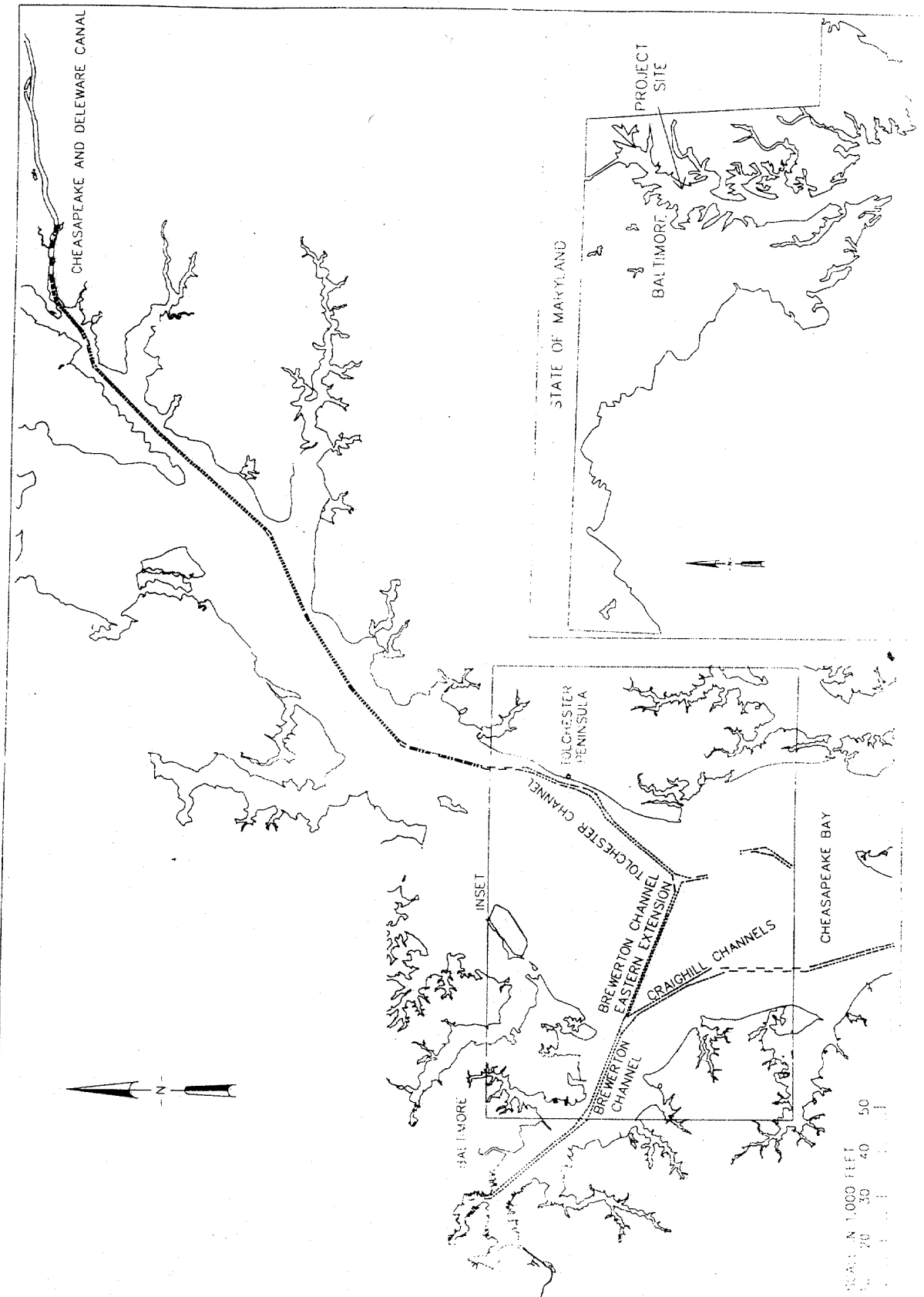


FIGURE 2 PROJECT LOCATION MAP



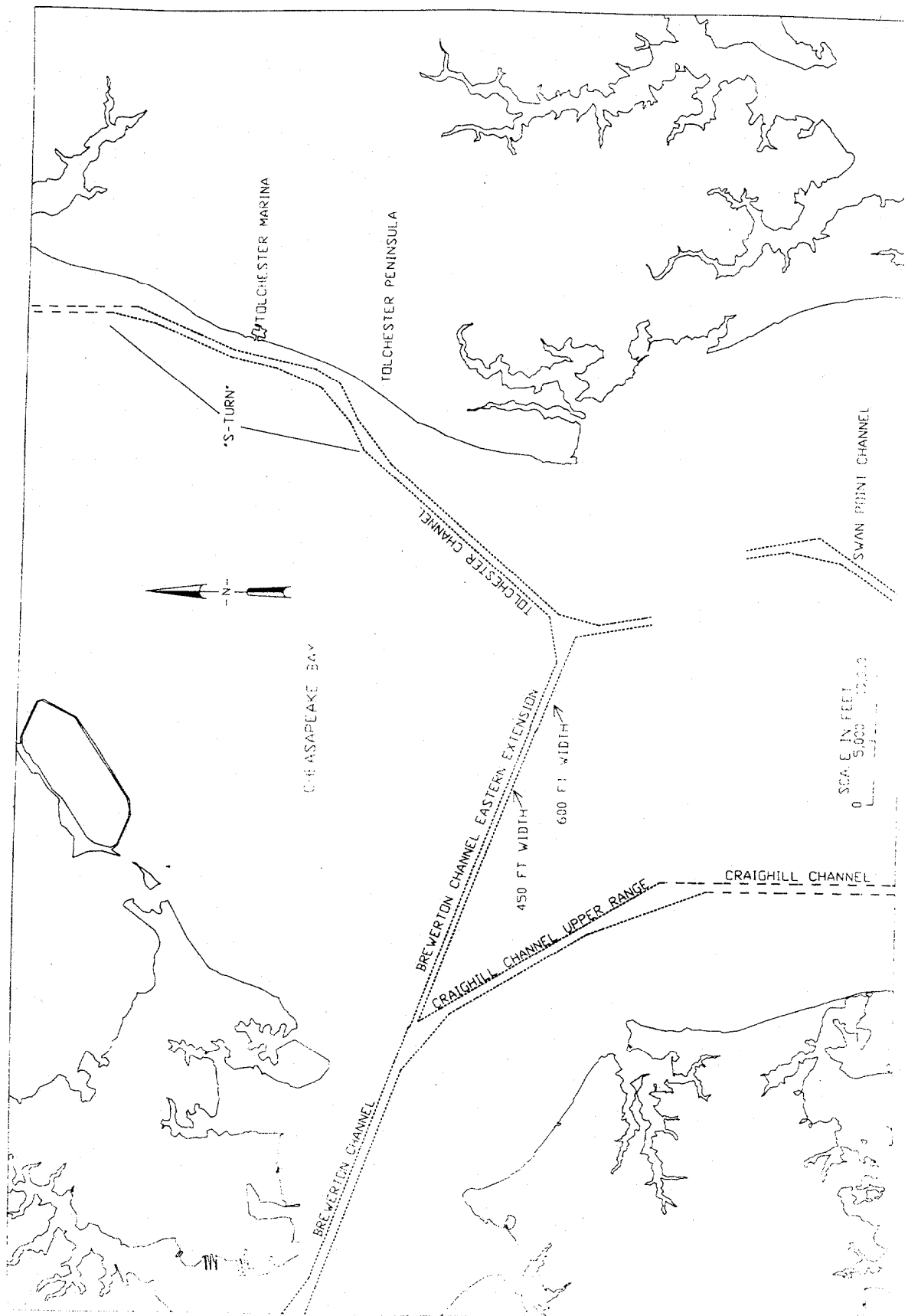
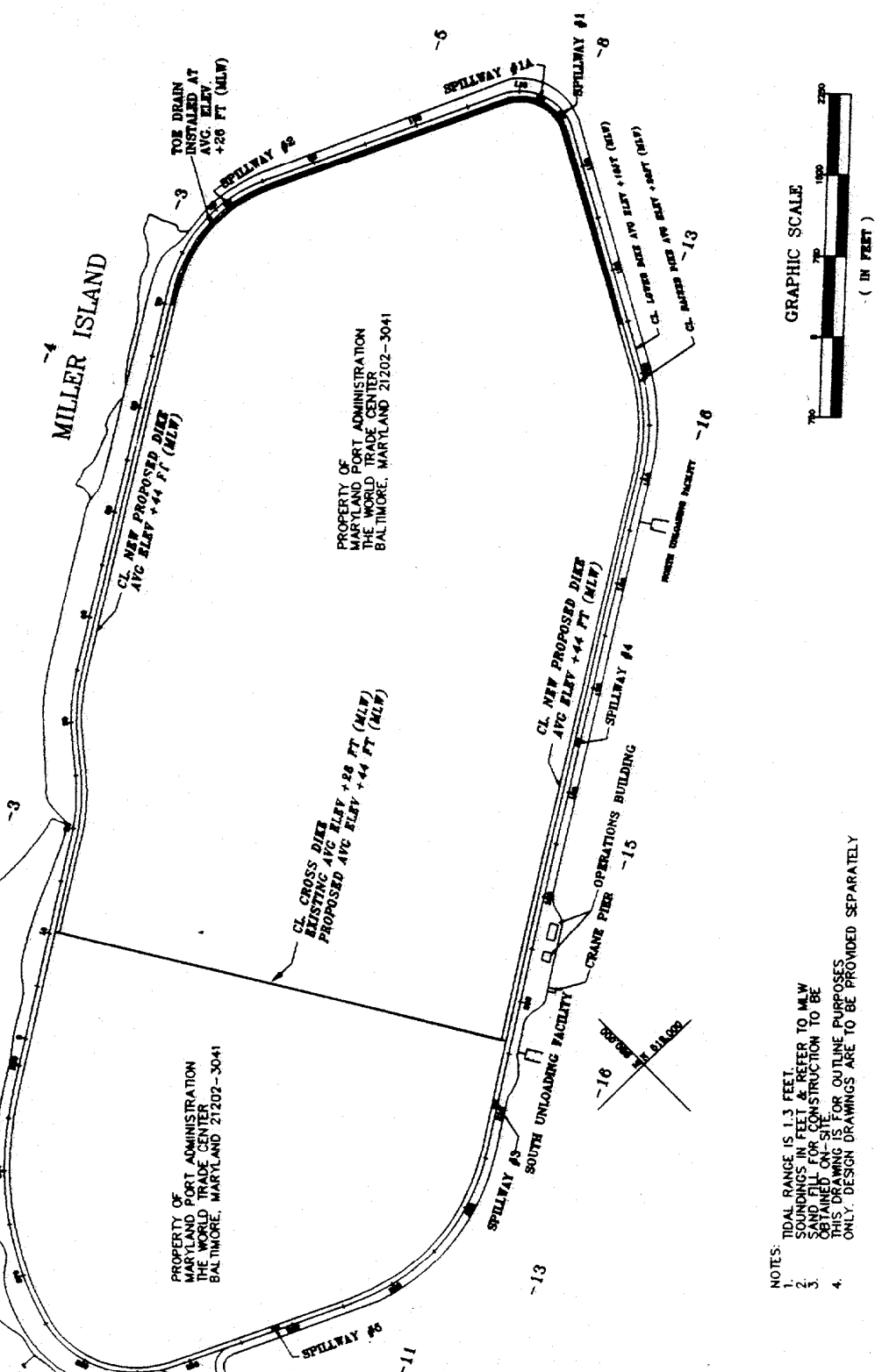
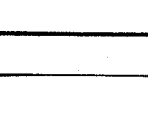
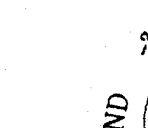
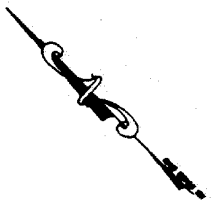


Figure 3 - Brewerton Channels



NOTES: TIDAL RANGE IS 1.3 FEET.  
1. SOUNDINGS IN FEET & REFER TO MLW  
2. SAND FILL FOR CONSTRUCTION TO BE  
3. SHOWN ON SHEET FOR OUTLINE PURPOSES  
4. THIS DRAWING IS FOR OUTLINE PURPOSES  
ONLY. DESIGN DRAWINGS ARE TO BE PROVIDED SEPARATELY

IN: CHESAPEAKE BAY  
NEAR: MOUTH OF BACK RIVER, BALTIMORE CO.  
APPL. BY: MARYLAND PORT ADMINISTRATION  
DATE: MARCH 27, 1996  
ENCLOSURE 1 SHEET 2 OF 4



## EA APPENDIX III

### Species Lists

Total catch by species in bottom trawls

Species	August 1981 <sup>1</sup>	August 1982 <sup>2</sup>	Sept. 1983 <sup>3</sup>	Oct. 1984 <sup>4</sup>
Spot	6,840	697	564	666
Bluefish	1	4	7	
Croaker	-	-	78	
Hogchoker	311	25	13	5
Anchovy	366	72	493	
White perch	468	81	9	953
Summer flounder	17	-	11	
Striped bass	1	3	4	5
Gizzard shad	-	-	2	
Menhaden	24	2	10	5
Blue crab	(3)*	(3)	199	99
American eel	118	-		
Channel catfish	12	42		3
Sea trout	82	1		
Winter flounder	2			
Pipefish	1			
Naked goby		1		
Harvestfish				1

<sup>1</sup>Tsai, 1982

<sup>2</sup>CRC Publ. #114, 1984

<sup>3</sup>3rd Interpretive Report, 1984

<sup>4</sup>present data

\*not recorded

### Beach Seine

A total of 1,897 individuals, representing 16 species were taken during the 1984-85 seine sampling unit. These species are identified in Tables 1 and 2.

Striped bass	<u>Morone saxatilis</u>
White perch	<u>Morone americana</u>
Yellow perch	<u>Perca flavescens</u>
Atlantic silverside	<u>Menidia menidia</u>
Bay anchovy	<u>Anchoa mitchilli</u>
Menhaden	<u>Brevoortia tyrannus</u>
American eel	<u>Anguilla rostrata</u>
Gizzard shad	<u>Dorosoma cepedianum</u>
Pipefish	<u>Synhatus fuscus</u>
Carp	<u>Cyprinus carpio</u>
Pumpkinseed	<u>Lepomis gibbosus</u>
Spot	<u>Leiostomus xanthurus</u>
Striped killifish	<u>Fundulus majalis</u>
Bluefish	<u>Pomatomus saltatrix</u>
Banded killifish	<u>Fundulus diaphanus</u>
Blue crab	<u>Callinectes sapidus</u>

As with the previous year's sample, anchovies and silversides were the most common species. With some exceptions diversity and distribution were similar to observations from the past year's survey. For the October sample, however,

## WATERBIRDS AT HART-MILLER - 1987

[illegible]

KAES	RFR	WEBB	RFR	WEBB	KAES	KAES	RFR	KAES	RFR	RFR	RFR	RFR	BLOM	KAES	RFR	RFR	KAES	RFR	RFR
DIXO	DIXO	GOSS	EDWA	RICC	DIXO	DIXO	KAES	RESC	WIER	BLOM	KAES	DIXO	KAES	CHES	H MU	DIXO	DIXO	DIXO	DIXO
WEBB	WEBB	EDWA	LOTT		SIMO	LETZ	DIXO	H MU		KAES	DIXO	WEBB	DIXO	McIN	H MU	RICC	STAE	STAE	STAE
PLAN	GOSS	LOTT	HEAT				RESC	H MU		DIXO	WEBB	RICC	RESC	+16		BOM			
GOSS	KIRS						SWEA			RICC		SANF	M O'			S GE			
+1							+1						P O'			R GE			
													KIRK			TERR			
																RESC			

## continued

SPECIES	6-6	9-11	9-20	9-27	10-3	10-11	10-18	10-25	11-1	11-8	11-15
COMMON LOON			24		44		14	1			
PIED-BILLED GREBE			4	2				1	1	1	3
BARN SWAN											
WHITE PELICAN											
GREAT CORMORANT							14	1	14		
DOUBLE-CRESTED CORMORANT	20	60	80	75	40	40	9	2	9		
LEAST BITTERN											
GREAT BLUE HERON	+	30	10	15	10	10	15	15	20	25	25
GREAT EGRET	1	1									
SNOWY EGRET											
EGRET, sp.											
TRICOLOR HERON											
GREEN-BACKED HERON		1		1							
BLACK-CROWNED NIGHT-HERON	2	1		3	1	8	7	11	6	2	2
GLOSSY IBIS											
SWAN, sp.			24								
CANADA GOOSE				54			54				164
WOOD DUCK											
GREEN-WINGED TEAL		30	200	250	100	200	400	400	300	220	300
BLACK DUCK	2	1	4	8	10	12	8	20	30	10	25
MALLARD	+	100	100	80	80	50	20	40	20	75	100
PINTAIL		1	6	200	2	2	6	3	17	200	80
BLUE-WINGED TEAL	+	+	50	10							
SHOVELER	+	175	250	200	200	300	150	200	200	450	175
WALL											
EDN				3		15		1	5	35	25
WATERBACK	1			2				2	12	50	400
PINK-NECKED DUCK		1							2		2
GREATER SCAUP	1	2	3	25	+	5		15	+	+	+
LESSER SCAUP	2	4	11	15	+	800	+	200	+	+	+
SCAUP, sp.				20	150		12000	12000	15000	15000	18000
SCAUP, TOTAL	3	6	14	60	150	835	12000	12215	15000	15000	18000
CLOSMAN											2
GOLDENEYE									13	22	
BUFFLEHEAD									20	85	50
HOODED MERGANSER									1	1	
COMMON MERGANSER											
RED-BREADED MERGANSER									14	5	6
RUDDY DUCK	46	51	53	225	+	1000	1000	3500	5000	300	1000
RAIL, sp.			1h	1h							
SORA						1					
MOORHEN											
COOT				1		1	7	15	15	6	10
BLACK-BELLIED PLOVER			2	5	10	15	12	10	6	5	10
GOLDEN-PLOVER		4	2	26	25	2					
SEMPAUMATED PLOVER	15	5		7	10	5	3	3			
KILLDEER	3	4	1	2		12	11	2	1	6	
SYSTEMATCHER											
AVOCET	1	2	1								
GREATER YELLOWLEGS	2	1	2	2		1	2	2	2		
LESSER YELLOWLEGS	25	40	60	30	30	40	45		11		
YELLOWLEGS, sp.											
WILLET											
SPOTTED SANDPIPER	7	6	2								
WINTERPEL											
PUDDY TURNSTONE	1	1	1								
RED JACOT											

SMITH'S GULL	10	10	30	40	60	2	13	9	7	
SANDPATED SANDPIPER	3	50	200	10	1	3	1		1	
WESTERN SANDPIPER	2	25	40	4	25	25	4	2		
LEAST SANDPIPER	20	10	20	2	10	2	6		7	
WHITE-RUMPED SANDPIPER	1		120	35	3	3	2	3	1	
BAIRD'S SANDPIPER	7	1	2	4	2	10	1		1	
TEP, sp.	100		50							
LECTORAL SANDPIPER			12	60	75	120	170	65	50	
DUNLIN				20	30	3	45	100	100	3 40
STILT SANDPIPER				1	12		4			
BUFF-BREASTED SANDPIPER			1							
SHORT-BILLED DOWITCHER	3		1	1	1					
LONG-BILLED DOWITCHER				3	2		3	1	1	
WILSON'S PHALAROPE	1			6	1					
RED-NECKED PHALAROPE			1	1						
PHALAROPE, sp.										
LAUGHING GULL		50	150	250	+	100	300	400	600	200 50
BONAPARTE'S GULL						1	1	5		2 2
RING-BILLED GULL	+	2500	1200	2000	+	400	6000	6000	7000	5000 2000
HEFFING GULL	+	30	500	500	+	300	1200	2500	600	100 150
LESSER BLACK-BACK		1			4	2	5	4	1	1 1
GREAT BLACK-BACK	+	300	600	750	+	250	125	50	125	40 50
CASPIAN TERN	+	300	225	125	50	25	55	15	2	
ROYAL TERN	2	4	4	3	2	2		5	8	
COMMON TERN										
FURSTER'S TERN	30	150	2	4		4		2		
LEAST TERN										
BLACK TERN	1									
BLACK SKIMMER	2									

#### NESTS:

Common Tern - 1 egg  
 2 eggs  
 3 eggs  
 NE tot

Least Tern - with eg

#### OBSERVERS

RFR RFR RFR RFR RFR KAEST RFR BLOM PFR KAEST RFR  
 KAES BLOM KAES DIXO KAES BLOM PICCI KAEST DIXON WEBE  
 WEBB DIXO PICCI STAS KUBI RICCI MUMFO STASZ SWEAF RICCI  
 KUBI MUMF P O' BOYD STEIN TERPY  
 MOZUR

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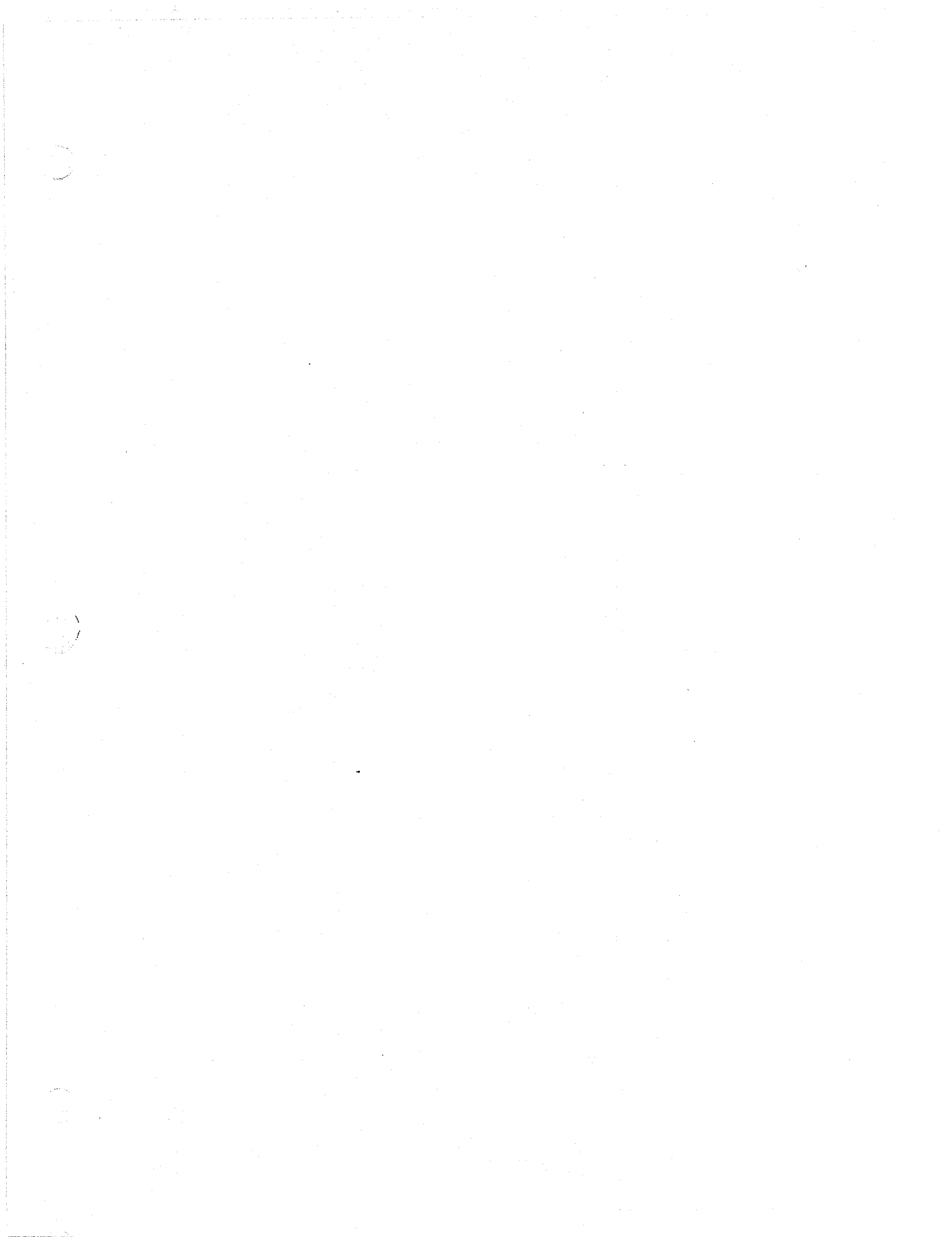
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## EA APPENDIX IV

404(b) (1) Evaluation



**CLEAN WATER ACT  
SECTION 404(b)(1) EVALUATION**

**PROPOSED DREDGING TO IMPROVE NAVIGATION IN THE  
BREWERTON CHANNEL EASTERN EXTENSION,  
BALTIMORE HARBOR AND CHANNELS PROJECT,  
BALTIMORE COUNTY AND KENT COUNTY, MARYLAND**

**WITH PROPOSED PLACEMENT OF DREDGED SEDIMENTS  
AT THE HART-MILLER ISLAND CONTAINMENT FACILITY,  
BALTIMORE COUNTY, MARYLAND**

10 April 1997

**I. PROJECT DESCRIPTION**

**a. Location** - Brewerton Channel Eastern Extension, Chesapeake Bay, Baltimore County and Kent County, Maryland, and Hart-Miller Island Containment Facility, Baltimore County, Maryland. See attached map.

**b. General Description** - The proposed project consists of dredging approximately 2,500,000 cubic yards (cy) of sediment from Brewerton Channel Eastern Extension to widen the existing -35 feet mean lower low water (MLLW) channel from 450 feet wide to 600 feet wide.

**c. Purpose** - The purpose of the proposed project is to increase efficiency and safety of the Port of Baltimore by improving (widening) the Brewerton Channel Eastern Extension.

**d. General Description of Dredged Material** - Sediments proposed for dredging are generally soft to medium hard, highly plastic, silty clay with occasional fractions of shell or shell fragments, sand, gravel, cobbles, and wood pieces.

**e. Description of the Proposed Discharge Sites** - Dredged sediments resulting from the proposed improvements will be placed at the Hart-Miller Island Dredged Material Containment Facility. Dredged sediments generated from periodic maintenance dredging of the channel after widening will be placed and managed in accordance with the project dredged material management plan. Currently approved

placement options for O&M sediments include the Hart-Miller Island Containment Facility and the Poplar Island Habitat Restoration Project, once the site is constructed. Future placement alternatives may also include an open-water placement site in the central reaches of the Chesapeake Bay. This 404(b)(1) evaluation is only applicable to the proposed dredging with placement of dredged material at the Hart-Miller Island Containment Facility. Maintenance dredging of the Brewerton Channel Eastern Extension, with placement of dredged material at the Poplar Island Restoration Project, has been evaluated in conjunction with that project's Feasibility Report/EIS and has been found in compliance with the Section 404 Guidelines. Consideration of other placement alternatives in the future would necessitate another 404(b)(1) evaluation specific to the proposed action.

The Hart-Miller Island Containment Facility is a two-cell, 1,140-acre island in the Chesapeake Bay near the mouth of the Back River, Baltimore County, Maryland. The south cell has been closed to placement of dredged material since October 1990 and is being developed as a wildlife habitat area. The north cell, approximately 800 acres, is circumscribed by dikes that are being raised incrementally from +28 feet to +44 feet mean lower low water (MLLW). The site will have a remaining dredged material capacity of approximately 30 million cubic yards once the dikes are raised to +44 feet MLLW.

**f. Description of Discharge Method** - It is expected that the proposed dredged material will be dredged mechanically and placed in barges; the filled barges will be towed or pushed to the proposed placement site where the sediments will be pumped into the containment cell. The dredged material will be allowed to settle and consolidate. Supernatant water will be returned to the Chesapeake Bay through weirs or similar control structures.

## **II. FACTUAL DETERMINATIONS**

### **a. Physical Substrate Determinations**

(1) **Substrate Elevation and Slope** - The proposed placement site has been used previously for the placement of dredged material. The north cell dikes of the Hart-Miller Island Containment Facility are being raised to +44 feet MLLW.

(2) **Sediment Type** - Sediments proposed for dredging are generally soft to medium, highly plastic, silty clay with occasional fractions of shell or shell fragments, sand, gravel, cobbles, and wood pieces.

The soils at the Hart-Miller Island Containment Facility consist of multiple layers of dredged material, primarily silts and clays ranging from low to high moisture content.

The dredged material layer is underlain by tan-white to red-white clays or a clay and silt matrix representative of native materials.

(3) Discharge Material Movement - The discharge material will be placed within containment dikes at the proposed placement site. The spillways and weirs will be managed to minimize movement of dredged material solids beyond the containment dikes.

(4) Physical Effects on Benthos - The area of proposed dredging supports a depauperate benthic community. Little or no impact is expected at the dredging site, and recolonization of dredged areas by the same species or by similar species is likely between maintenance dredging episodes. Benthos at the placement site, if present, will be covered with dredged material. No impacts to benthos are expected outside of the placement site.

(5) Other Effects - N/A

(6) Actions Taken to Minimize Impacts - Dredged material will be contained behind the aforesaid dikes. Final surface elevation of the site will vary. The Hart-Miller Island dikes are expected to have a final elevation at about +44 feet MLLW.

#### **b. Water Circulation, Fluctuation, and Salinity Determinations**

(1) Water - Temporary changes are expected in clarity, color, and quality of waters of the Chesapeake Bay in the immediate vicinity of the proposed dredging. Supernatant water released from the placement site should not affect clarity or color of nearby waters outside the mixing zone in the Chesapeake Bay.

(a) Salinity - No change is expected.

(b) Chemistry - Minor and temporary changes are possible in the immediate vicinity of the dredging operations. Minor and temporary changes are possible within the allowed mixing zone<sup>1</sup> at the placement site. No change is expected outside the allowed mixing zone.

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<sup>1</sup> The actual mixing zone for the site can only be determined after completing placement site design. Needed information includes the number and type of discharge control structures, exact location of proposed discharge structures, the size (capacity) of containment cells, and the maximum rate of dredged material placement.

(c) Clarity - Minor and temporary changes are expected in the immediate vicinity of the dredging operations. Minor and temporary changes are possible within the allowed mixing zone at the placement site.

(d) Color - Minor and temporary changes are possible in the immediate vicinity of the dredging operations. Minor and temporary changes are possible within the allowed mixing zone at the placement site.

(e) Odor- Minor and temporary changes are possible in the immediate vicinity of the dredging operations. Minor and temporary changes are possible in the immediate vicinity of unloading operations at the placement site.

(f) Taste - N/A.

(g) Dissolved Gas Levels - Temporary changes (increase and/or decrease of dissolved oxygen) may occur in the immediate vicinity of the dredging operations. No change is expected outside the placement site.

(h) Nutrients - Temporary (24 to 72 hour) localized increase expected at dredging site due to resuspension of sediment during dredging operations. A slight and also temporary increase in nutrients may occur at placement site outfalls. Neither increase is likely to cause an increase in algal blooms.

(i) Eutrophication - Not expected to occur.

(j) Others as Appropriate - None.

(2) Current Patterns and Circulation - Only limited and localized effects are anticipated.

(a) Current Patterns and Flow - Minimal effects are expected under normal conditions.

(b) Velocity - No significant change in velocity is anticipated.

(c) Stratification - No change is expected.

(d) Hydrologic Regime - No significant changes are expected.

(3) Normal Water Level Fluctuations - No change is expected.

(4) Salinity Gradients - No change is expected.

(5) Actions to Minimize Impacts - None.

**c. Suspended Particulate/Turbidity Determinations**

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Project Sites - Minor and temporary increase of suspended particulate and turbidity are expected in the immediate vicinity of the dredging operations. No change is expected in suspended particulates and turbidity levels outside of the allowed mixing zone at the placement sites.

(2) Effects on Chemical and Physical Properties of the Water Column - Minor and temporary changes are expected in the immediate vicinity of the dredging operations. No change is expected outside the allowed mixing zone at the placement sites.

(a) Light penetration - A minor, temporary decrease is anticipated in the immediate vicinity of the dredge plant during dredging operations. A minor, temporary decrease is possible within the allowed mixing zone at the placement sites. No change is expected outside allowed mixing zones.

(b) Dissolved Oxygen - A minor temporary change is possible in the immediate vicinity of dredging operations. No change is expected outside the allowed mixing zone at the placement sites.

(c) Toxic Metals and Organics - Dredging operations are not expected to cause the release of any measurable amount of metals or organic contaminants from the dredged material into the water column. No change is expected outside the allowed mixing zone at the placement sites.

(d) Pathogens - No change is expected.

(e) Aesthetics - No change is expected.

(f) Others as Appropriate - N/A.

**d. Contaminant Determinations**

Sediments proposed for dredging have been tested to measure concentrations of priority pollutants. Results indicate that most priority pollutants are either not present in the proposed dredged material or are present in concentrations lower than prescribed method detection limits. The exceptions fall into two categories - heavy metals and petroleum aromatic hydrocarbons (PAH). All detected heavy metals were present in

concentrations that are typical of background levels in this region of the Bay. The PAH compounds measured are above background levels at some stations and at significantly higher than background levels at one single station in the middle reach of the channel. At stations where PAH compounds were detected, we did not discover measurable levels of all PAH compounds; instead we detected only significant levels of a subset of the known PAH compounds that are typical of burnt wood, charcoal, etc. Accordingly, and because there is anecdotal information suggesting disposal of debris from the great Baltimore Fire of 1904 in the Bay outside the mouth of the Patapsco River, we believe that the measured PAH contamination is related to pieces of burnt wood or coal in the dredged material and is not indicative of widespread industrial contamination. We further conclude that dredging and placement of the dredged material at the Hart-Miller Island Containment Facility is unlikely to result in the release of these contaminants to the marine environment.

An extracted summary of results of chemical analysis is presented in Appendix F of the Limited Reevaluation Report, Brewerton Channel Eastern Extension, Baltimore Harbor and Channels, Maryland.

#### **e. Aquatic Ecosystem and Organism Determinations**

- (1) Effects on Plankton - Plankton in the immediate vicinity of the dredging site may be displaced or entrained with the dredged material. These effects are expected to be temporary and are not significant.
- (2) Effects on Benthos - Benthos in the immediate vicinity of the dredging site will be displaced and/or entrained with the dredged material. Effects are expected to be temporary. Sediment conditions in the immediate vicinity of the project may be more suitable for benthos after dredging operations are completed. Benthic recolonization should occur within 3 to 9 months. Benthos within the placement sites will be smothered with sediments. Effect is not expected to be significant. No effects are expected outside the placement sites.
- (3) Effects on Nekton - Nekton in the immediate vicinity of the dredging site may be displaced or entrained with the dredged material. Effects are expected to be temporary.
- (4) Effects on Food Web - No significant effects are expected.
- (5) Effects on Special Aquatic Sites - The proposed dredging and placement of dredged material at the Hart-Miller Island Containment Facility will not impact special aquatic sites.

(6) **Threatened and Endangered Species** - There are no known threatened or endangered species in the project area.

(7) **Other Wildlife** - Impacts to wildlife at Hart-Miller Island are not significant during placement. When filled to the final elevation, the north cell of the Hart-Miller Island Containment Facility, like the south cell, will be developed as a wildlife habitat area.

(8) **Actions to Minimize Impacts** - The dredged material placed at the upland site will be confined to the diked area.

**f. Proposed Placement Site Determinations**

(1) **Mixing Zone Determinations** - The mixing zone for material disturbed and suspended by the proposed activities will be confined to the smallest practicable zone.

(2) **Determination of Compliance with Applicable Water Quality Standards** - The proposed work will be performed in accordance with all applicable State of Maryland water quality standards.

(3) **Potential Effects on Human Use Characteristics**

(a) **Municipal and Private Water Supply** - No effects are expected from dredging or placement of dredged material at Hart-Miller Island.

(b) **Recreational and Commercial Fisheries** - Very minor temporary and localized effects are possible from tug and barge traffic. There are no significant recreational or commercial fisheries in the area to be dredged.

(c) **Water Related Recreation** - Very minor temporary and localized effects are possible from tug and barge traffic and from dredge plant operation.

(d) **Aesthetics** - Very minor local and temporary effects are possible from tug and barge traffic and from dredge plant operation.

(e) **Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves** - No effect expected.

**g. Determination of Cumulative Effects on the Aquatic Ecosystem** - No permanent, long term, cumulative adverse effects to the existing aquatic ecosystem are expected as a result of the proposed project. At the dredging site, removal of sediment should improve sediment quality and entice a healthier benthic community. After

filling, the upland site can be developed as forested areas or other improved terrestrial habitat.

**h. Determination of Secondary Effects on the Aquatic Ecosystem** - No secondary effects are expected. (See paragraph f.(3)(a), above.)

### **III. FINDING OF COMPLIANCE**

No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

The use of the proposed placement site is not contrary to other state and Federal laws for the protection of water quality, aquatic species, or habitat; as follows:

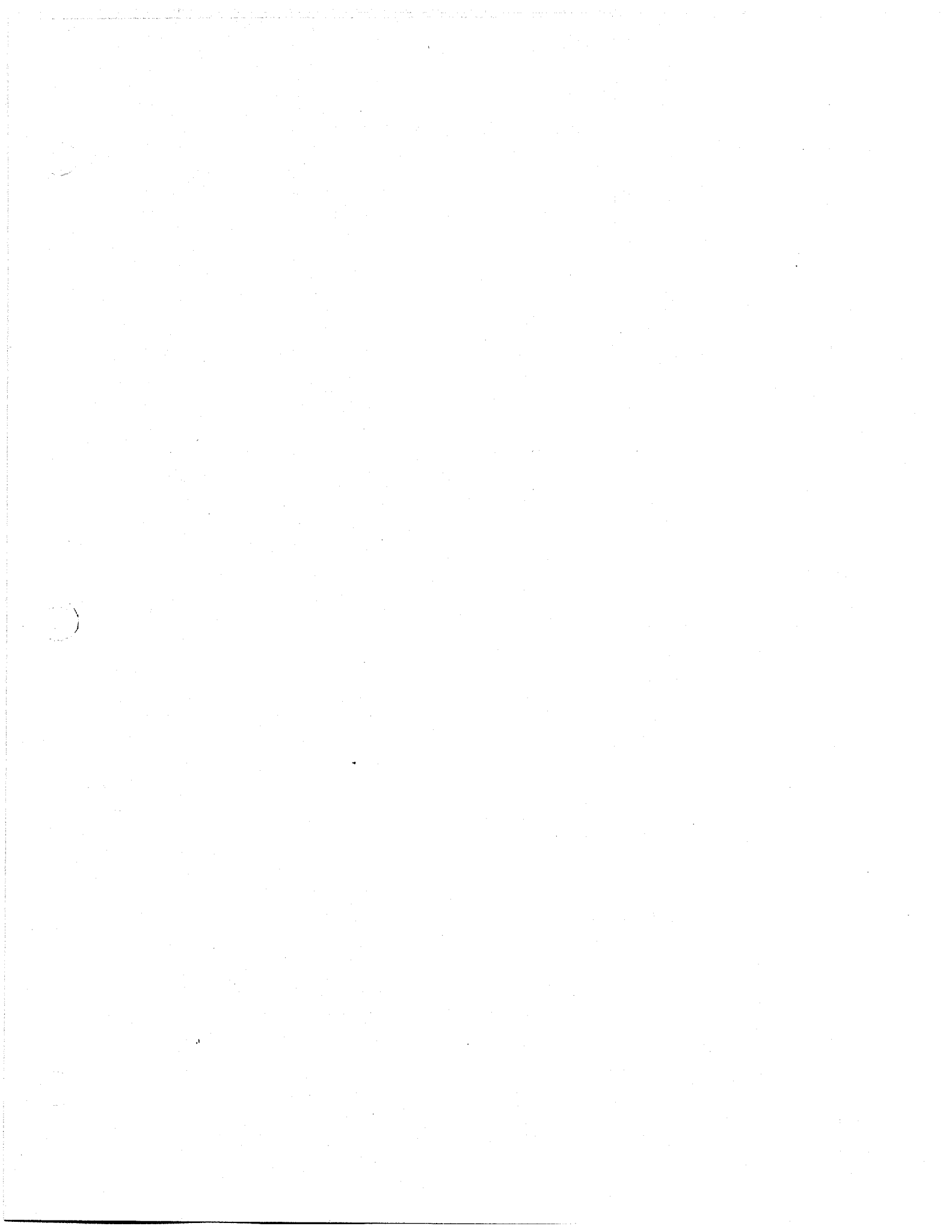
- (1) The proposed dredging and placement of dredged material will be in compliance with state water quality standards.
- (2) The proposed dredging and placement of dredged material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.
- (3) The proposed project will not negatively affect any threatened or endangered species.
- (4) No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.
- (5) The proposed project will not result in significant adverse effects on human health or welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. No contaminants will be discharged in toxic concentration in violation of Section 307 of the Clean Water Act.

Thus, the proposed dredging and the placement of dredged material at the Hart-Miller Island Dredged Material Containment Facility pass the requirements test of 40 CFR 230.10(b).

Parts I and II of the analysis (preceding) show that utilization of the proposed placement site will not contribute to the degradation of waters of the United States; and therefore, the proposed project and proposed use of the placement site does comply with the requirements of 40 CFR 230.10(c).

Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed in accordance with the conditions of the Department of the Army (DA) permit and the Maryland Department of the Environment wetlands license.

The mandatory sequence of the Section 404(b)(1) Guidelines has been applied in evaluation of the proposed action. The proposed dredging and placement of the dredged material at the Hart-Miller Island Containment Facility is in compliance with the Section 404(b)(1) Guidelines.



## EA APPENDIX V

### Table of Regulatory Compliance Requirements

## Regulatory Compliance Requirements

<u>Federal Statutes</u>	<u>Level of Compliance</u>
Anadromous Fish Conservation Act	N/A
Archeological and Historic Preservation Act	FULL
Clean Air Act	FULL
Clean Water Act	FULL
Coastal Barrier Resources Act	FULL
Coastal Zone Management Act	FULL
Comprehensive Environmental Response, Compensation and Liability Act	FULL
Endangered Species Act	N/A
Estuary Protection Act	FULL
Federal Water Project Recreation Act	FULL
Fish and Wildlife Coordination Act	FULL
Land and Water Conservation Fund Act	FULL
Marine Mammal Protection Act	N/A
National Historic Preservation Act	FULL
National Environmental Policy Act	FULL
Resource Conservation and Recovery Act	FULL
Rivers and Harbors Act	FULL
Watershed Protection and Flood Prevention Act	FULL
Wild and Scenic Rivers Act	N/A
	N/A
<u>Executive Orders, Memoranda, etc.</u>	
Protection and Enhancement of Cultural Environment (E.O. 11593)	FULL
Floodplain Management (E.O. 11988)	FULL
Protection of Wetlands (E.O. 11990)	FULL
Prime and Unique Farmlands (CEQ Memorandum, 11 Aug 80)	N/A
Environmental Justice in Minority and Low-Income Populations (E.O. 12898)	FULL

### Note:

Full Compliance (Full): Having met all requirements of the statute, E.O. or other environmental requirements for the current stage of planning.

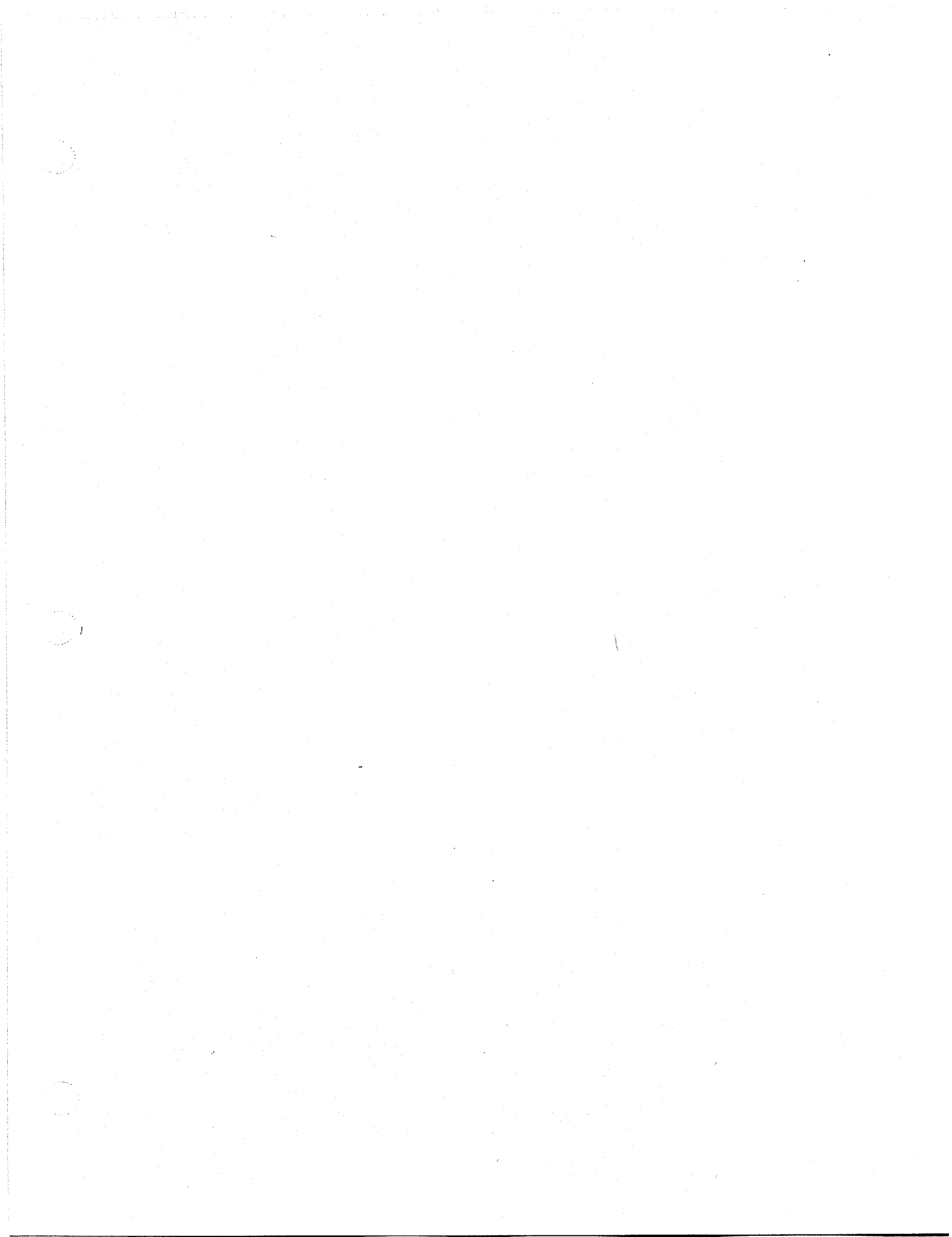
Partial Compliance (Partial): Not having met some of the requirements that normally are met in the current stage of planning.

Non-Compliance (NC): Violation of a requirement of the statute, E.O. or other environmental requirement.

Not Applicable (N/A): No requirements for the statute, E.O. or other environmental requirement for the current stage of planning.

## EA APPENDIX VI

### Sediment Data



MDL	BE-1	BE-2	BE-3	BE-4	BE-5	BE-6
<b>Volatiles</b>						
1,1-Dichloroethane	1	n	n	n	n	n
1,1-Dichloroethene	1	n	n	n	n	n
1,1,1-Trichloroethane	0.7	n	n	n	n	n
1,1,2-Trichloroethane	1	n	n	n	n	n
1,1,2,2-Tetrachloroethane	1	n	n	n	n	n
1,2-Dichloroethane	1	n	n	n	n	n
1,2-Dichloropropane	2	n	n	n	n	n
2-Butanone	2	n	n	n	n	n
2-Chloroethyl vinyl ether	1	n	n	n	n	n
Acrolein	11	n	n	n	n	n
Acrylonitrile	7	n	n	n	n	n
Benzene	1	n	n	n	n	n
Bromodichloromethane	1	n	n	n	n	n
Bromoform	1	n	n	n	n	n
Bromomethane	1	n	n	n	n	n
Carbon tetrachloride	0.5	n	n	n	n	n
Chlorobenzene	0.7	n	n	n	n	n
Chloroethane	2	n	n	n	n	n
Chloroform	1	n	n	n	n	n
Chloromethane	2	n	n	n	n	n
cis-1,3-Dichloropropene	0.7	n	n	n	n	n
Dibromochloromethane	1	n	n	n	n	n
Dichlorodifluoromethane	1	n	n	n	n	n
Ethylbenzene	1	n	n	n	n	n
Methylene chloride	1	n	n	n	n	n
Tetrachlorethene	1	n	n	n	n	n
Toluene	0.7	n	n	n	n	n
trans-1,2-Dichlorethene	1	n	n	n	n	n
trans-1,3-Dichloropropene	1	n	n	n	n	n
Trichloroethene	0.7	n	n	n	n	n
Trichlorofluoromethane	1	n	n	n	n	n
Vinyl chloride	1	n	n	n	n	n

MDL	BE-1	BE-2	BE-3	BE-4	BE-5	BE-6
<b>Semi-volatiles</b>						
1,2-Dichlorobenzene	n	n	n	n	n	n
1,2-Diphenylhydrazine	n	n	n	n	n	n
1,2,4-Trichlorobenzene	n	n	n	n	n	n
1,3-Dichlorobenzene	n	n	n	n	n	n
1,4-Dichlorobenzene	n	n	n	n	n	n
2-Chloronaphthalene	n	n	n	n	n	n
2-Chlorophenol	n	n	n	n	n	n
2-Methyl-4,6-dinitrophenol	n	n	n	n	n	n
2-Methylphenol	n	n	n	n	n	n
2-nitroaniline	n	n	n	n	n	n
2-nitrophenol	n	n	n	n	n	n
2,2'-oxybis(1-Chloropropane)	n	n	n	n	n	n
2,4-Dichlorophenol	n	n	n	n	n	n
2,4-Dimethylphenol	n	n	n	n	n	n
2,4-Dinitrophenol	n	n	n	n	n	n
2,4-Dinitrotoluene	n	n	n	n	n	n
2,4,5-Trichlorophenol	n	n	n	n	n	n
2,4,6-Trichlorophenol	n	n	n	n	n	n
2,6-Dinitrotoluene	n	n	n	n	n	n
3-nitroaniline	n	n	n	n	n	n
3+4 Methylphenol	n	n	n	n	n	n
3,3'-Dichlorobenzidine	n	n	n	n	n	n
4-Bromophenyl phenyl ether	n	n	n	n	n	n
4-Chloro-3-methylphenol	n	n	n	n	n	n
4-Chloroaniline	n	n	n	n	n	n
4-Chlorophenyl phenyl ether	n	n	n	n	n	n
4-nitroaniline	n	n	n	n	n	n
4-nitrophenol	n	n	n	n	n	n
Benzidine	n	n	n	n	n	n
Benzoic acid	n	n	n	n	n	n
Benzyl alcohol	n	n	n	n	n	n
Benzyl butyl phthalate	n	n	n	n	n	n
bis-(2-Chloroethoxy) methane	n	n	n	n	n	n

	MDL	BE-1	BE-2	BE-3	BE-4	BE-5	BE-6
<i>bis</i> -(2-Chloroethyl) ether	310	n	n	n	n	n	n
<i>bis</i> -(2-Ethylhexyl) phthalate	290	n	n	n	n	n	n
Carbazole	110	n	n	n	n	n	n
Cyclohexanone	440	n	n	n	n	n	n
Dibenzofuran	100	n	n	n	n	n	n
Diethyl phthalate	110	n	n	n	n	n	n
Dimethyl phthalate	91	n	n	n	n	n	n
Di- <i>n</i> -butyl phthalate	110	n	n	n	n	n	n
Di- <i>n</i> -octyl phthalate	76	n	n	n	n	n	n
Hexachlorobenzene	130	n	n	n	n	n	n
Hexachlorobutadiene	330	n	n	n	n	n	n
Hexachlorocyclopentadiene	160	n	n	n	n	n	n
Hexachloroethane	400	n	n	n	n	n	n
Isophorone	170	n	n	n	n	n	n
nitrobenzene	270	n	n	n	n	n	n
<i>n</i> -nitrosodimethylamine	360	n	n	n	n	n	n
<i>n</i> -nitrosdi- <i>n</i> -propylamine	180	n	n	n	n	n	n
<i>n</i> -nitrosodiphenylamine	140	n	n	n	n	n	n
Pentachlorophenol	150	n	n	n	n	n	n
Phenol	200	n	n	n	n	n	n
Pyridine	260	n	n	n	n	n	n

# PAHs

1-Methylnaphthalene	31	n	n	78	n	n	n
2-Methylnaphthalene	31	n	n	190	n	n	n
Acenaphthene	31	n	n	420	n	n	n
Acenaphthylene	31	n	n	n	n	n	n
Anthracene	3	3.7	n	44	3.3	n	n
Benzo[a]pyrene	4	14	4.8	120	9.9	n	n
Benzo[b]fluoranthene	5	25	10	160	21	n	n
Benzo[g,h,i]perylene	4	11	4.7	89	12	12	n
Benzo[k]fluoranthene	2	6.3	n	62	4.1	n	n
Ben[a]anthracene	1.5	11	3.1	96	7.5	n	n
						1.9	

	MDL	BE-1	BE-2	BE-3	BE-4	BE-5	BE-6
Chrysene	2	14	3.5	120	88	2.4	n
Dibenz[a,h]anthracene	3	n	n	12	n	n	n
Fluoranthene	5	19	6.1	290	14	n	n
Fluorene	7	36	24	77	23	n	n
Ideno[1,2,3-cd]pyrene	4	9.8	n	98	8.8	n	n
naphthalene	31	110	n	73	n	n	n
Phenanthrene	2	15	8.4	170	10	n	n
Pyrene	4	19	8.1	150	12	n	n

#### Pesticides

4,4'-DDDD	3.3	n	n	n	n	n	n
4,4'-DDE	0.7	n	n	n	n	n	n
4,4'-DDT	3.6	n	n	n	n	n	n
Aldrin	0.4	n	n	n	n	n	n
α-BHC	2.4	n	n	n	n	n	n
Azinphos methyl	15	n	n	n	n	n	n
β-BHC	0.3	n	n	n	n	n	n
Chlordane, technical	8.2	n	n	n	n	n	n
Chlorobenside	1.5	n	n	n	n	n	n
Daethal	1.5	n	n	n	n	n	n
δ-BHC	0.4	n	n	n	n	n	n
Demeton	15	n	n	n	n	n	n
Dieldrin	3	n	n	n	n	n	n
Enosulfan I	0.2	n	n	n	n	n	n
Enosulfan II	0.5	n	n	n	n	n	n
Enosulfan sulfate	1.2	n	n	n	n	n	n
Enrin	3.1	n	n	n	n	n	n
Enrin aldehyde	0.2	n	n	n	n	n	n
Ethyl parathion	1.5	n	n	n	n	n	n
γ-BHC	1.6	n	n	n	n	n	n
Heptachlor	2	n	n	n	n	n	n
Heptachlor epoxide	0.2	n	n	1.8	n	n	n
Malathion	1.5	n	n	n	n	n	n

	MDL	BE-1	BE-2	BE-3	BE-4	BE-5	BE-6
Methoxychlor	27	n	n	n	n	n	n
Methyl parathion	1.5	n	n	n	n	n	n
Mirex	1.5	n	n	n	n	n	n
Toxaphene	120	n	n	n	n	n	n
<b>PCSs (as Aroclor)</b>							
Aroclor-1016	9	n	n	n	n	n	n
Aroclor-1221	22	n	n	n	n	n	n
Aroclor-1232	7	n	n	n	n	n	n
Aroclor-1242	9	n	n	n	n	n	n
Aroclor-1248	2	n	n	n	n	n	n
Aroclor-1254	4	n	n	n	n	n	n
Aroclor-1260	2	n	n	n	n	n	n

#### Metals

Aluminum	6	23100	26700	20000	22800	29400	22400
Antimony	0.2	n	n	n	n	n	n
Arsenic	0.2	17.4	14	12.8	10.4	13.9	12.9
Beryllium	0.2	2.4	2.2	1.3	1.6	2.1	1.5
Cadmium	0.2	2.7	2.3	1.7	1.9	2.1	1.7
Chromium	1	52.5	45.1	35.6	34.7	42.2	37.9
Copper	1	50.7	39.1	16.7	23.5	29.8	11.4
Iron	10	45500	49000	39900	25900	48900	43300
Lead	0.2	72.1	46.3	42.7	29	31.7	18.4
Manganese	1	4780	1890	1440	2030	2400	1360
Mercury	0.1	0.52	0.42	0.26	0.93	0.16	n
Nickel	2	75.5	60	29.4	38.8	48.9	33.3
Selenium	0.4	1.9	1.0	1.5	1.0	1.4	1.7
Silver	0.6	1.4	n	n	n	n	n
Thallium	0.4	n	n	n	n	n	n
Zinc	1	362	242	111	123	154	101

	MDL	BE-1	BE-2	BE-3	BE-4	BE-5	BE-6
<b>Organotins</b>							
Dibutyltin							
Monobutyltin							
Tributyltin (TBT)							
<b>General Chemistry</b>							
Carbon, total organic							
Cyanide, total	0.5	64200	43900	26200	15400	27500	28400
nitrogen, ammonia		1.7	0.86	1.7	n	1.8	n
nitrogen, nitrate an nitrite		350	84.8	153	124	97.8	104
nitrogen, total Kjeldahl		5.2	3.2	4.9	3.8	3.9	4.2
Oxygen demand, biochemical		930	1330	922	1020	1120	1460
Oxygen demand, chemical		1330	2080	911	1490	1450	932
Phosphorus, total		43800	47600	33300	46700	32600	36600
Sulfide, total	50	1050	672	385	644	842	436
		143	769	n	n	50.6	n

MDL<sup>1</sup> BE-7 BE-8 BE-9 BE-10

Volatiles

1,1-Dichloroethane	1	n	n	n	n
1,1-Dichloroethene	1	n	n	n	n
1,1,1-Trichloroethane	0.7	n	n	n	n
1,1,2-Trichloroethane	1	n	n	n	n
1,1,2,2-Tetrachloroethane	1	n	n	n	n
1,2-Dichloroethane	1	n	n	n	n
1,2-Dichloropropane	2	n	n	n	n
2-Butanone	2	n	n	n	n
2-Chloroethyl vinyl ether	1	n	n	n	n
Acrolein	11	n	n	n	n
Acrylonitrile	7	n	n	n	n
Benzene	1	n	n	n	n
Bromodichloromethane	1	n	n	n	n
Bromoform	1	n	n	n	n
Bromomethane	1	n	n	n	n
Carbon tetrachloride	0.5	n	n	n	n
Chlorobenzene	0.7	n	n	n	n
Chloroethane	2	n	n	n	n
Chloroform	1	n	n	n	n
Chloromethane	2	n	n	n	n
cis-1,3-Dichloropropene	0.7	n	n	n	n
Dibromochloromethane	1	n	n	n	n
Dichlorodifluoromethane	1	n	n	n	n
Ethylbenzene	1	n	n	n	n
Methylene chloride	1	n	n	n	n
Tetrachlorethene	1	n	n	n	n
Toluene	0.7	n	n	n	n
trans-1,2-Dichlorethene	1	n	n	n	n
trans-1,3-Dichloropropene	1	n	n	n	n
Trichloroethene	0.7	n	n	n	n
Trichlorofluoromethane	1	n	n	n	n
Vinyl chloride	1	n	n	n	n

# Semi-volatiles

MDL	BE-7	BE-8	BE-9	BE-10
1,2-Dichlorobenzene	n	n	n	n
1,2-Diphenylhydrazine	n	n	n	n
1,2,4-Trichlorobenzene	n	n	n	n
1,3-Dichlorobenzene	n	n	n	n
1,4-Dichlorobenzene	n	n	n	n
2-Chloronaphthalene	n	n	n	n
2-Chlorophenol	n	n	n	n
2-Methyl-4,6-dinitrophenol	n	n	n	n
2-Methylphenol	n	n	n	n
2-nitroaniline	n	n	n	n
2-nitrophenol	n	n	n	n
2,2'-oxybis(1-Chloropropane)	n	n	n	n
2,4-Dichlorophenol	n	n	n	n
2,4-Dimethylphenol	n	n	n	n
2,4-Dinitrophenol	n	n	n	n
2,4-Dinitrotoluene	n	n	n	n
2,4,5-Trichlorophenol	n	n	n	n
2,4,6-Trichlorophenol	n	n	n	n
2,6-Dinitrotoluene	n	n	n	n
3-nitroaniline	n	n	n	n
3+4 Methylphenol	n	n	n	n
3,3'-Dichlorobenzidine	n	n	n	n
4-Bromophenyl phenyl ether	n	n	n	n
4-Chloro-3-methylphenol	n	n	n	n
4-Chloroaniline	n	n	n	n
4-Chlorophenyl phenyl ether	n	n	n	n
4-nitroaniline	n	n	n	n
4-nitrophenol	n	n	n	n
Benzidine	n	n	n	n
Benzoic acid	n	n	n	n
Benzyl alcohol	n	n	n	n
Benzyl butyl phthalate	n	n	n	n
bis-(2-Chloroethoxy) methane	n	n	n	n

	MDL	BE-7	BE-8	BE-9	BE-10
<i>bis</i> -(2-Chloroethyl) ether	310	n	n	n	n
<i>bis</i> -(2-Ethylhexyl) phthalate	290	n	n	n	n
Carbazole	110	n	n	n	n
Cyclohexanone	440	n	n	n	n
Dibenzofuran	100	n	n	n	n
Diethyl phthalate	110	n	n	n	n
Dimethyl phthalate	91	n	n	n	n
Di- <i>n</i> -butyl phthalate	110	n	n	n	n
Di- <i>n</i> -octyl phthalate	76	n	n	n	n
Hexachlorobenzene	130	n	n	n	n
Hexachlorobutadiene	330	n	n	n	n
Hexachlorocyclopentadiene	160	n	n	n	n
Hexachloroethane	400	n	n	n	n
Isophorone	170	n	n	n	n
nitrobenzene	270	n	n	n	n
<i>n</i> -nitrosodimethylamine	360	n	n	n	n
<i>n</i> -nitrosdi- <i>n</i> -propylamine	180	n	n	n	n
<i>n</i> -nitrosodiphenylamine	140	n	n	n	n
Pentachlorophenol	150	n	n	n	n
Phenol	200	n	n	n	n
Pyridine	260	n	n	n	n

# PAHs

1-Methylnaphthalene	31	n	n	n	n
2-Methylnaphthalene	31	n	n	n	n
Acenaphthene	31	n	59	n	n
Acenaphthylene	31	n	n	n	n
Anthracene	3	n	4.7	n	n
Benzo[a]pyrene	4	n	14	n	n
Benzo[b]fluoranthene	5	n	28	n	n
Benzo[g,h,i]perylene	4	n	84	9.2	8.7
Benzo[k]fluoranthene	2	n	62	n	n
Ben[a]anthracene	1.5	n	7.3	3.4	3.2
Chrysene	2	n	39	4.1	n

	MDL	BE-7	BE-8	BE-9	BE-10
Dibenz[a,h]anthracene	3	n	n	n	n
Fluoranthene	5	n	24	n	n
Fluorene	7	n	170	n	n
Idenol[1,2,3-cd]pyrene	4	n	9	5.3	n
Naphthalene	31	n	72	n	n
Phenanthrene	2	3.9	18	4.3	4.1
Pyrene	4	8.1	22	7.5	6.7

#### Pesticides

4,4'-DDD	3.3	n	n	n	n
4,4'-DDE	0.7	1.5	n	n	n
4,4'-DDT	3.6	n	n	n	n
Aldrin	0.4	n	n	n	n
α-BHC	2.4	n	n	n	n
Azinphos methyl	15	n	n	n	n
β-BHC	0.3	n	n	n	n
Chlordane, technical	8.2	n	n	n	n
Chlorobenzide	1.5	n	n	n	n
Dacthal	1.5	n	n	n	n
δ-BHC	0.4	n	n	n	n
Demeton	15	n	n	n	n
Dieldrin	3	n	n	n	n
Enosulfan I	0.2	n	n	n	n
Enosulfan II	0.5	n	n	n	n
Enosulfan sulfate	1.2	n	n	n	n
Enrin	3.1	n	n	n	n
Enrin aldehyde	0.2	n	n	n	n
Ethyl parathion	1.5	n	n	n	n
γ-BHC	1.6	n	n	n	n
Heptachlor	2	n	n	n	n
Heptachlor epoxide	0.2	n	n	1.8	n
Malathion	1.5	n	n	n	n
Methoxychlor	27	n	n	n	n
Methyl parathion	1.5	n	n	n	n

MDL	BE-7	BE-8	BE-9	BE-10					
1.5	n	n	n	n	n	n	n	n	n
120	n	n	n	n	n	n	n	n	n
9	n	n	n	n	n	n	n	n	n
22	n	n	n	n	n	n	n	n	n
7	n	n	n	n	n	n	n	n	n
9	n	n	n	n	n	n	n	n	n
2	n	n	n	n	n	n	n	n	n
4	n	n	n	n	n	n	n	n	n
2	n	n	n	n	n	n	n	n	n
6	20700	24500	22900	21800					
0.2	n	n	n	n					
0.2	14.2	19.6	15.1	20.3					
0.2	2.1	2.3	2.3	2.4					
0.2	2.0	2.3	2.3	2.5					
1	50.2	57.8	51	75.7					
1	38.2	45.7	43.2	53.4					
10	41300	48000	46000	52300					
0.2	54.2	63.2	60.5	78.7					
1	6000	3910	7000	6610					
0.1	0.50	0.47	0.49	0.63					
2	62.7	65.6	76.4	72.1					
0.4	1.9	0.95	2.4	1.9					
0.6	n	1.0	1.3	1.3					
0.4	n	n	n	n					
1	305	354	332	412					

color)

	MDL	BE-7	BE-8	BE-9	BE-10
<b>Organotins</b>					
Dibutyltin					
Monobutyltin					
Tributyltin (TBT)					
<b>General Chemistry</b>					
Carbon, total organic		66900	61500	53500	49000
Cyanide, total	0.5	3.6	1.9	0.59	n
Nitrogen, ammonia		47	162	20.4	102
Nitrogen, nitrate and nitrite		n	42	3.1	6.5
Nitrogen, total Kjeldahl		1860	815	1320	1570
Oxygen demand, biochemical		2800	2080	1840	2020
Oxygen demand, chemical		163000	902000	39000	58000
Phosphorus, total		1430	1010	948	1110
Sulfide, total	50	321	59.4	2220	734

#### Notes

- MDL... Nominal method detection limit; actual MDLs may vary slightly from the given value at each station.

